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VIÉGAS (A. P.) & TEIXEIRA (C. G.). **Alguns fungos de Minas Gerais.** [Some fungi of Minas Gerais.]—*Rodriguésia*, ix, 19, pp. 49–56, 6 pl., 1945. (Issued 1946.)

Among the 19 specimens of fungi from Minas Gerais, Brazil, submitted for examination in February, 1945, were *Cercospora sesami* on sesame [*R.A.M.*, xxiv, pp. 219, 388] and *Phyllachora tupi* n.nom. causing a leaf spot of *Oplismenus hirtellus* [*O. compositus*]. According to the information at the author's disposal the latter species is identical with *Montagnella* (?)*puiggarii* Speg., but as that specific epithet has already been applied by Theissen and Sydow to another member of the genus on a leguminous plant (*Ann. mycol., Berl.*, xiii, p. 512, 1915), the parasite of *O. compositus* is renamed *P. tupi* with the additional synonyms *P. graminis* (Pers.) Fuck. [*R.A.M.*, xxiv, p. 251] var. *tupi* f. *oplismeni* Speg. and *Phragmocarpella puiggarii* (Speg.) Theiss. & Syd.

The list also includes *Clavaria parasitica* parasitic on a species of *Catacauma* [? *Phyllachora*] on living leaves of Myrtaceae.

VIÉGAS (A. P.). **Alguns fungos do Brasil. VII–VIII. Cyphellaceae e Thelephoraceae.** [Some fungi of Brazil. VII–VIII. Fungi Imperfecti (Sphaeropsidales).]—*Bragantia, S. Paulo*, v, 4, pp. 253–290, 16 pl., 1945.

The following records are selected from this further instalment [cf. *R.A.M.*, xxv, p. 234; xxvi, p. 81] of the author's critical studies on Brazilian fungi: *Corticium salmonicolor* on Pear oranges, *Exobasidium vaccinii* on *Rhododendron viscosum* [ibid., xxiii, p. 346]; *Pellicularia filamentosa* [*C. solani*: ibid., xxii, p. 372] on *Asplenium* sp., bitter orange, *Datura stramonium*, Virginia, Kentucky, Turkish, and Chinese tobacco, *Nicotiana rustica, N. glutinosa, N. silvestris, Solanum nigrum*, potato, *Nicandra physaloides, Bidens pilosa*, bean (*Phaseolus vulgaris*), *Eleusine indica*, hybrids of *Ananas* sp., and *Hybanthus atropurpureus* [*Ionidium atropurpureum*]; and *Pellicularia* [*C.*] *koleroga* [ibid., xxii, p. 372] on pear and peach (previously reported by Noack on apple and quince in *Bol. Inst. agron. S. Paulo*, ix, pp. 75–88, 1898).

VIÉGAS (A. P.). **Alguns fungos do Brasil. XI. Fungi Imperfecti (Sphaeropsidales).** [Some fungi of Brazil. XI. Fungi Imperfecti (Sphaeropsidales).]—*Bragantia, S. Paulo*, v, 12, pp. 717–779, 25 pl., 3 figs., 1945.

This further instalment of the author's critical study of Brazilian fungi [see preceding abstract] comprises 22 new species, including *Aschersonia caapi* parasitizing coccids on the foliage of Gramineae, *Phyllosticta guajavae* on guava, and *Rhabdospora bambusae* on *Bambusa pallescens*. The pulvinate, ashen, pruinose, isolated or conglobate stromata of *A. caapi* are 1 to 2·5 mm. in diameter. The immersed, irregular pycnidia measure 240 to 300 μ in diameter. The hyaline, subulate, branched conidiophores bear hyaline, fusoid, biguttulate, smooth conidia, 8 to 11 by 2·5 to 3 μ.

The lesions produced by *P. guajavae* on the under sides of the leaves are brick-red, delimited from the healthy tissues by a purplish-black zone, while those on the upper sides are paler and more diffuse. The spots attain a length of several

centimetres. The depressed, mostly triangular, subepidermal, ostiolate, black pycnidia measure 90 to 120 μ in diameter and 50 to 60 μ in height. The hyaline, acicular, simple conidiophores, 8 to 10 μ in length, bear hyaline, smooth, ellipsoid, biguttulate conidia, 5 to 7 by 2 μ.

R. bambusae is characterized by numerous globose to depressed, subepidermal, indistinctly ostiolate, black pycnidia, 300 to 400 μ in diameter and 100 to 200 μ [to 120 μ in Portuguese text] in height, with carbonaceous walls 20 to 28 μ thick. The cylindrical, straight or curved, smooth, septate, fuscous conidia, 36 to 48 by 2·5 to 3 μ, are borne on hyaline conidiophores, 20 by 2·5 to 3 μ.

Among the other records may be mentioned *Aschersonia aleyrodis* parasitizing Aleyrodidae [*R.A.M.*, xv, p. 216] on orange and cassava; *A. andropogonis* and *A. basicystis* on Aleyrodidae infecting *Myrciaria jaboticaba* leaves; *A. goldiana* on Aleyrodidae on orange; *A. turbinata* on Aleyrodidae and unspecified insects on guava, and on undetermined insects on *Citrus* sp., and *A. blumenaviensis*, *A. crenulata*, and *A. cubensis* on Aleyrodidae on unidentified hosts; *Ascochyta citri* on orange, mandarin orange, and lime [ibid., xxi, p. 324]; *Cicinnobolus cesatii* hyperparasitic on *Oidium anacardii* on *Anacardium occidentale* and *O.* sp. on *Hibiscus esculentus* [cf. ibid., xxiv, p. 476]; *Cytospora sacchari* on sugar-cane; *C. salicis* on *Salix* spp. (first record for Brazil); *Darluca filum* [ibid., xxi, pp. 472, 493; xxiv, p. 476] hyperparasitic on *Uredo* sp. on *Panicum maximum* and on *Puccinia levis* on *Tricholaena rosea*; *Diplodia macrospora* and *D. zeae* on maize [ibid., xxiv, p. 363]; *D. natalensis* on *Aleurites fordii*, groundnut [ibid., xxiv, p. 189], papaw, orange, cotton, sweet potato, cassava, *Manihot glaziovii*, mulberry [loc. cit.], and bean (*Phaseolus vulgaris*) seed; *D. tubericola* [ibid., xviii, p. 788] and *Phyllosticta batatas* [ibid., xxiii, p. 428] on sweet potato; *Macrophomina phaseoli* on bean; *Phomopsis* [*Diaporthe*] *citri* on orange, tangerine, and grapefruit; *Septoria callistephi* on *Callistephus chinensis* and *Aster* sp. [ibid., x, p. 734]; *S. dianthi* on carnation [ibid., x, p. 297; xxi, p. 324; xxiii, p. 409; xxiv, p. 475]; *S. lactucae* on lettuce [ibid., xxiv, p. 135]; *S. loefgreni* Noack on orange; *S. petroselini* on parsley [ibid., xxiv, pp. 158, 476]; and *Physalospora* (*Sphaeropsis*) *malorum Peck* [*P. obtusa*: ibid., xiii, p. 312] on apple.

RAYSS (T.). **Nouvelle contribution à l'étude de la mycoflora de Palestine (troisième partie).** [A new contribution to the study of the mycoflora of Palestine (third part).]—*Palest. J. Bot.*, J. Ser., iii, 3, pp. 151–166, 4 figs., 4 graphs, 1945.

This further instalment of the author's critically annotated studies on the mycoflora of Palestine [*R.A.M.*, xx, p. 495; cf. also xxii, p. 497] comprises 40 species (two Archimycetes and 38 other Phycomycetes), of which 31 are mentioned for the first time in the present series. The list, which brings the total number of Palestine fungi investigated by the author to 422, includes three new species and one new form.

Reference may be made to the following items. *Pseudoperonospora cubensis* develops during the height of summer on cucumber leaves in the coastal plain, the exceptional lateness of its appearance, in comparison with other downy mildews, being probably correlated with the heavy local falls of dew.

Peronospora matthiolae Gaeum. occurs on *Matthiola incana*, *P. aestivalis* [*P. trifoliorum*] on lucerne [ibid., xxii, p. 112; xxv, p. 455], *P. meliloti* [*P. trifoliorum*] on *Melilotus indicus* [loc. cit.], *P. arthuri* on *Clarkia elegans* [ibid., xxv, p. 342], *P. antirrhini* on *Antirrhinum orontium* [ibid., xxv, p. 454], and *Bremia lactucae* on *Carthamus tenuis*, *Crepis aspera*, *C. bulbosa*, *Picris galilaea*, and *Lagoseris* [*Pterotheca*] *bifida*. Nine species of *Mucor* were isolated from soil samples.

MAIRE (R.). **Études mycologiques. Fascicule 5.** [Mycological studies. Part 5.]—*Bull. Soc. Hist. nat. Afr. N.*, xxxvi, 1–7, pp. 24–42, 9 figs., 1945.

In this further contribution to his series of mycological studies [cf. *R.A.M.*, x, p. 692], the author gives descriptive notes of 20 new and little-known species of

fungi found by him in Europe and North Africa, including *Phyllosticta fulvomaculans* n.sp. on orange leaves in Algeria, *Phomopsis algerica* n.sp. on mandarin twigs in Algeria, and *Ascochyta boehmeriae* n.sp. on leaves of *Boehmeria nivea* at Algiers, all three being parasitic.

PETRAK (F.). **Über die Gattung Geminispora Pat.** [On the genus *Geminispora* Pat.] —*Ann. mycol., Berl.*, xlii, 1–2, pp. 72–74, 1944. [Received December, 1946.]

Evidence is adduced, from examination of material collected by Sydow in Ecuador, in support of the inseparability of *Geminispora* Pat. from *Phyllachora*. Hence, the former should be regarded as a synonym of the latter and the type species, *G. mimosae*, a parasite of *Mimosa floribunda* in Ecuador, renamed *P. mimosae* (Pat.) Petr.

PETRAK (F.). **Fungi.** *Ex* RECHINGER (K. H.) et al. **Ergebnisse einer botanischen Reise nach der Iran, 1937.** [Fungi. Results of a botanical expedition to Iran, 1937.]—*Ann. natur. Mus.* (*Hofmus.*) *Wien*, 1, pp. 414–521, 10 figs., 1940. [Received December, 1946.]

Among the fungi found on material collected on an expedition through Persia [cf. *R.A.M.*, xxi, p. 99] in 1937 were *Gymnosporangium clavariiforme* [ibid., xx, p. 330] on *Cotoneaster nummularia* [*C. racemiflora*] and *G. confusum* on medlar [ibid., xxiv, p. 376] in the provinces of Khorasan and Mazanderan, respectively. This critically annotated list comprises four new genera, 38 new species, three new varieties, and one new combination.

PETRAK (F.). **Fungi.** *Ex* RECHINGER (K. H.) et al. **Neue Beiträge zur Flora von Kreta.** [Fungi. New contributions to the flora of Crete.]—*Denkschr. Akad. Wiss. Wien*, cv, 2, pp. 9–26, 1943. [Received December, 1946.]

The fungi found on material collected by K. H. RECHINGER in Crete during a botanical expedition from April to July, 1942, included, besides one new genus and 16 new species, *Graphiola phoenicis* on date palms [*R.A.M.*, xvii, p. 504], *Puccinia graminis* on *Berberis cretica*, *P. scolymi* on *Scolymus hispanicus*, *Ustilago cynodontis* on *Cynodon dactylon*, *U. hordei* on barley, and *Septoria apii* on celery.

PETRAK (F.). **Über einige Arten der Gattung Phyllosticta.** [On some species of the genus *Phyllosticta*.]—*Ann. mycol., Berl.*, xlii, 1–2, pp. 81–87, 1944. [Received December, 1946.]

Evidence is presented for the identification of the fungus described by Wenzel as *Phyllosticta angulata*, the agent of an apple leaf spot in Austria [*R.A.M.*, xv, p. 814] with *P. lantanae* Pass., 1882, collected by the author in 1917 in south-east Galicia on leaves of apple, elm, *Viburnum lantana*, and *Prunus serotina*. Another synonym is *Phyllosticta translucens* Bub. & Kab. (*Ann. mycol., Berl.*, xiii, p. 109, 1915).

DRECHSLER (C.). **Zoospore development from oospores of Pythium ultimum and Pythium debaryanum and its relation to rootlet-tip discoloration.**—*Plant Dis. Reptr*, xxx, 7, pp. 226–227, 1946. [Mimeographed.]

Oospores of *Pythium ultimum* from maize meal agar plate cultures three months old produced zoospores within 18 hours after transfer to a shallow layer of water in Petri dishes maintained at 10° C. An evacuation tube, usually 3 to 6 μ wide beyond the frequently broadened base, was pushed through the oogonial wall and grew to a total length of 10 to 40 μ, when it formed a papilla through which the protoplasmic contents soon migrated into a vesicle where, usually, eight to ten zoospores were formed. When encysted they measured mostly 8 to 10 (rarely up to 13) μ in diameter and germinated by the emission of one or two hyphae, usually 2 to 3 μ wide, but they also often show repetitional emergence. At 25° the spores

germinated by hyphae even without the addition of fresh water, after removal to a glass slide.

Zoospore formation has not before been recorded for *P. ultimum*. The activity of this fungus and of *P. debaryanum* in causing damping-off is not apparently related to the development of zoospores, since the fungus easily spreads by means of the growth of the mycelium in the soil, but the frequent occurrence of *P. ultimum* as the cause of blackening of root tips, particularly under cool, wet conditions, does suggest zoospore infection. It would appear likely that under natural conditions zoospore production from the germination of after-ripened oospores may occur more abundantly than from the mycelial sporangia.

Addition of partly decayed leaf mould to maize meal agar plate cultures after the substratum had been well permeated by the fungus often resulted in a pronounced increase in oospore formation. The same treatment that induced oospore germination in *P. ultimum* was also successful with *P. debaryanum*, using oospores from maize meal agar plate cultures two months old. In prolonged wet periods, *P. debaryanum*, like *P. ultimum*, can often be isolated in quantity from blackened root tips of crop plants.

DRECHSLER (C.). **Several species of Pythium peculiar in their sexual development.**—*Phytopathology*, xxxvi, 10, pp. 781–864, 29 figs., 1946.

Supplementary discussions and illustrations are given of *Pythium oligandrum* and *P. salpingophorum*, originally described by the author in 1930 [*R.A.M.*, x, p. 211]; earlier accounts of *P. anandrum* [ibid., xviii, p. 651; cf. also xxiii, p. 359; xxiv, p. 188] and *P. periplocum* [ibid., xviii, p. 650] are amplified, and comparative observations are made on the morphology and development of the congeneric species *P. vexans* [ibid., xix, p. 283; xxi, p. 344; xxii, pp. 305, 319; xxiv, p. 275] and *P. undulatum* Petersen sensu Dissmann (*Arch. Protistenk.*, lx, pp. 142–192, 1927).

P. oligandrum is a common occupant not only of damped-off seedlings, but also of decaying stems and roots of older plants in widely separated localities of the United States, among its hosts being peas, beans (*Phaseolus vulgaris*), sweet potato, tomato, sugar beet, sweet peas, and wheat. The species probably occurs as a secondary invader in the majority of cases, but it was encountered once, unaccompanied by any other likely pathogen, in a cucumber fruit affected by watery decay in the field near Beltsville, Maryland, and inoculations through incisions on the same host and watermelon gave positive results. The zoosporangia of *Pythium oligandrum* generally resemble those of *P. acanthicum* [*R.A.M.*, xviii, p. 650]. The subspherical, spiny oogonium is usually delimited proximally by a massive plug and distally by a cross wall; it often includes a cylindrical prolongation at one or both ends and may occasionally be entirely cylindrical. Parthenogenetical development is very common; where one or two antheridia are present, they usually arise from a single branch. The mycelial connexion between the male and female organs is seldom traceable; where it can be discerned, its total length may range from 250 (occasionally only 125) to 600 μ. At maturity the oospore usually contains 4 to 15 refringent bodies embedded in the granular parietal layer surrounding the single reserve globule. After a six months' resting period it germinates on shallow irrigation, often giving rise to zoospores by the discharge of its undifferentiated contents into a vesicle through an evacuation tube 10 to 50 μ long. The germination process in *P. periplocum* is similar, the germ-hypha, after reaching a length of 50 to 200 μ, frequently serving as an evacuation tube for the passage of the granular contents into a vesicle where they are converted into zoospores.

In the case of *P. vexans*, of which *P. complectens* [ibid., iv, p. 286] is regarded as a synonym, the oogonium and antheridium are united at a very early stage, and during their subsequent expansion their outward shapes may undergo considerable

modification in the area of contact, notably where a hard agar medium offers resistance to their growth. In water or soft agar, however, the oogonium largely retains its original form, while the antheridium frequently develops into a structure consisting of two to four elongate-digitate or more broadly lobate parts which clasp the oogonium. The antheridium is borne at the tip of a branch arising either from the oogonial or an adjacent hypha. The oospores germinate freely in water, often producing zoospores. The protoplast produces either a germ-hypha serving as an evacuation tube or a zoosporangium sessile on the oogonial sheath or terminal on a germ-hypha. *P. vexans* has been isolated from the root systems of peas, sweet potato, pansy, tomato, chilli, beans, sugar beet, celery, spinach, and other plants. Oospores of *P. anandrum* from three-month-old cultures usually give rise to zoospores on germination.

When *P. salpingophorum*, *P. vexans*, *P. undulatum*, and *P. anandrum* are grown on an agar medium in opposition to *P. oligandrum*, *P. periplocum*, or *P. acanthicum*, their mycelial advance is arrested through the envelopment and invasion of the hyphae by branches from the antagonist. Similar injuries are sustained by the above-mentioned four species cultured in opposition to *Aphanomyces cladogamus* [ibid., xxii, pp. 114, 373] or *Plectospira myriandra* [loc. cit.]. Conversely, the hyphae of *Pythium periplocum* may suffer damage from the appressoria of *P. vexans*.

NEWHALL (A. G.). **More on the name Ansatospora acerina.**—*Phytopathology*, xxxvi, 10, pp. 893–896, 1946.

It is pointed out that Neergaard's name of *Centrospora ohlsenii* takes precedence over the author's *Ansatospora macrospora* [*R.A.M.*, xxv, p. 343] and the new combination *A. acerina* (Hartig) of Hansen and Tompkins [ibid., xxiv, p. 305]. However, Neergaard had evidently missed Hartig's paper [loc. cit.], assigning the name of *Cercospora acerina* to the pathogen of *Acer pseudoplatanus* seedlings. Priority and the rules of nomenclature dictate the retention of the earliest specific name, and the fungus should therefore be known in future as *Centrospora acerina* (Hartig) n.comb., the synonyms including *Sporidesmium acerinum* (Hart.) Frank, *Cercosporella acerina* (Hart.) Arnaud, *Cercospora macrospora* Ostw., *C. cari* Westend. & Van Luijk, and *C. praegrandis* Sprague.

The last-named, the agent of a leaf spot of *Osmorhiza brevipes* in Oregon, is of interest as an additional record of the pathogen on a new host generically related to *Petroselinum*, *Carum*, and *Apium*, on which it has already been described. The rejection of the name *Ansatospora* in favour of *Centrospora* entails the substitution of *C. bromi* (Sprague) [n.comb.] for *A. bromi* on *Bromus rigidus* [ibid., xxv, p. 345].

The evidence supplied by Rader [ibid., xxiv, p. 487], Truscott [ibid., xxiv, p. 174], and others supports Hartig's opinion that *C. acerina* is capable of a saprophytic existence in the soil. It is a low-temperature pathogen with a fairly wide host range, unlike the leaf-spotting members of the genus *Cercospora*. With these attributes *Centrospora acerina* might assume a serious character but for the exacting requirements of the conidia and their rather brief period of viability. The fungus appears to be most troublesome under the humidity and temperature conditions associated with a maritime climate.

PRINCE (A. E.). **The biology of Gymnosporangium nidus-avis Thaxter.**—*Farlowia*, ii, 4, pp. 475–525, 2 pl., 2 graphs, 1 map, 1946.

These exhaustive studies of the taxonomy, distribution, and symptomatology of the heteroecious cedar-apple rust fungus, *Gymnosporangium nidus-avis* [*R.A.M.*, xiii, p. 780] have enabled the author to determine *G. juvescens* to be synonymous with it on the basis of the almost identical size and morphology of their periphyses and spermatia, the size and simultaneous appearance of the spermogonia, and the

absence of any difference in the morphology and size of the sori or in the aeciospore and teleutospore dimensions. Crowell's view [ibid., xx, p. 23] that *G. effusum* is synonymous with *G. nidus-avis* is rejected on the ground of morphological distinction of the telial phases (as shown by examination of type material from the Arthur herbarium) and difference in host ranges.

The hosts of the telial phase of *G. nidus-avis* show a nearly continuous and sometimes overlapping distribution in southern Canada and the United States, and it is believed that this rust will be found in every State and Province within the range of the telial hosts. Local distribution may be limited by the relative times of maturation of the teleutospores and foliar development of the aecidial host, the viability of the spores, and the physiography of the area. The existence of resistant *Juniperus* hosts, which can be confirmed at any time by field observations, also constitutes a limiting factor. Evidence from culture studies of the existence of resistant strains of the pomaceous or *Juniperus* hosts or both is given.

As a result of extensive inoculation experiments guidance can now be given as to which pomaceous trees can be grown near susceptible juniper species. The following additions to the extensive host list of this rust were made as a result of these experiments: *Amelanchier amabilis*, *A. asiatica* var. *sinica*, *A. bartramiana* × *A. laevis*, *A. florida*, *A. grandiflora* f. *rubescens*, *A. oblongifolia* var. *micropetala*, *A. sanguinea*, *A. sera*, *A. spicata*, *Amelasorbus jackii*, *Chaenomeles lagenaria* [*Cydonia japonica*], *Chaenomeles superba*, *Sorbaronia dippelii*, *Sorbus americana* and varieties *fructo-* its *alba* and *micrantha*, *S. aria* var. *salicifolia*, *S. aucuparia* and its varieties *edulis* and *xanthocarpa*, *S. discolor*, *S. japonica* var. *callocarpa*, *S. latifolia*, *S. scopulina*, and *S. thuringiaca*. All plants inoculated and found susceptible to one or more of the six strains used are listed in appendix I, and the 74 species and varieties found to be immune in appendix II.

Compared with other cedar-apple rusts, *G. nidus-avis* has little economic importance, requiring exceptionally favourable conditions in order to establish infection. Removal of the broom and the affected parts near its point of attachment is inferior as a control measure to the prevention of infection by not planting susceptible alternate hosts nearer than 300 ft. and to the practices recommended by MacLachlan and Crowell [ibid., xvi, p. 618].

QUANJER (H. M.). **'Premunity.'**—*Phytopathology*, xxxvi, 10, p. 892, 1946.

The term 'acquired immunity' has been used by Price [*R.A.M.*, xii, p. 120] and others to denote the condition of plants exhibiting no reaction to a further inoculation with a given virus once they have contracted infection with it or with a closely related virus or strain.

In human and animal pathology the term 'immunity' or 'acquired immunity' is used in a different sense, denoting the condition existing in organisms which have overcome and expelled a certain pathogen, and remain non-susceptible to it or a nearly related infective agent. In other cases, after a first infection and the partial or apparent restoration of health, the pathogen remains in the body, and the condition of non-susceptibility persists only as long as it is present. With its disappearance, susceptibility to the same or an allied agent once again develops. This condition has been described in French literature as 'premunity', and it is proposed to substitute this term in phytopathology for the state hitherto designated 'acquired immunity' [ibid., xxiii, p. 139].

FENNE (S. B.). **Summary of results of Tobacco blue mold (downy mildew) control demonstrations in Virginia, 1946.**—*Plant Dis. Reptr*, xxx, 10, pp. 382–384, 1946. [Mimeographed.]

During 1946 some 85 demonstrations in the use of fermate against tobacco blue mould or downy mildew (*Peronospora tabacina*) [*R.A.M.*, xxiii, p. 45; xxv, p. 5

were set up in Virginia. Over 50 reports were received from those co-operating, virtually all of whom expressed satisfaction with the treatment. Little infection (and that not severe) was present in most of the treated beds, whereas most unsprayed beds were a total loss and in almost all the remainder transplanting was delayed by about two weeks and the number of plants obtained amounted to only about 65 per cent. of those from the treated beds. It is estimated that over 50 per cent. of the growers in the flue-cured area and approximately 25 per cent. in the dark and Burley areas sprayed with fermate. In consequence, there was an ample supply of plants for the tobacco acreage in all three belts.

TEMME (J.). **Natrot bij Tabak (Nicotiana tabacum). Voorloopige mededeeling over een nog niet eerder beschreven bacterieziekte der Tabak.** [Wet rot of Tobacco (*Nicotiana tabacum*). Preliminary note on a hitherto undescribed bacterial disease of Tobacco.]—*Tijdschr. PlZiekt.*, xlix, 4, pp. 113–116, 2 pl., 1943. [Received November, 1946.]

In July, 1942, tobacco leaves, submitted to the Phytopathological Service at Wageningen, had rotten, brown, moist lesions along the main and lateral veins, from which a bacterium of the *Erwinia* group, designated 'strain 1', was isolated in pure culture. Inoculation experiments were successful only when the bacterial suspension was introduced through a capillary tube into the main vein. The organism measures 1 to 4·5 by 0·5 to 1 μ and is motile by peritrichous flagella. It is Gram-negative and forms on a yeast water-glucose agar medium dry, shallow colonies with a ridged margin, at first transparent, of a watery consistency, with a bluish-shot effect in transmitted light, later becoming white and opaque, and the periphery finally turning dirty yellow. 'Strain 1' differs from the related *E. aroideae*, the agent of a bulb, stem, and petiole rot in *Zantedeschia aethiopica* [*R.A.M.*, xx, p. 451], in its conspicuously pointed extremities, failure to coagulate litmus milk, and inability to convert raffinose and glycerol into acid; the carbohydrates utilized for this purpose are glucose, levulose, galactose, saccharose, maltose, lactose, arabinose, xylose, and mannitol. Gas is not developed either from sugars or as an accompaniment to the reduction of nitrates to nitrites. Neither cellulose nor starch is attacked, but the pectin in the middle lamellae of raw potatoes undergoes complete dissolution. The physiological and morphological characters of 'strain 1' are regarded as sufficiently distinctive to entitle it to rank as a new species, *E. nicotianae*.

F. A. Wolf, in 'Tobacco diseases and decays' [ibid., xv, p. 402], describes under the name of 'hollow stalk and black leg' a wet rot due to *E. aroideae* [cf. ibid., xviii, p. 481]. This may be identical with a 'wilt' of *Nicotiana rustica* reported from Leeuwen (Maas and Waal), in which the stems and petioles bear large, greyish-brown spots, the former dissolving into a slimy, malodorous mass and the latter drooping at the site of invasion; ultimately the foliage shrivels and turns yellow, and the whole plant collapses.

VASUDEVA (R. S.) & LAL (T. B.). **Big bud disease of the Tomato.**—*Indian J. agric. Sci.*, xiv, 2, pp. 160–162, 2 pl., 1946.

In the winter of 1943 two Sutton's Early Market tomato plants at the Imperial Agricultural Research Institute, New Delhi, were observed to be showing symptoms of the tomato big bud virus [*R.A.M.*, xx, pp. 182, 235; xxiv, p. 400], not previously known to occur in India. Characteristic features of the disease included an erect growth habit and floral anomalies, such as adhesion, virescence, certain types of overgrowth, and thickening of the pedicels due to the formation in the phloem of an abnormal tissue. The disease was transmitted to healthy plants by grafting only, the time required for infection being 48 days in the budding tests and 105 where the inarching method was used.

Jumelet (A.) & Van Koot (Y.). **Factoren, die het optreden van neusrot bij Tomaat bepalen.** [Factors determining the occurrence of Tomato blossom-end rot.]—*Tijdschr. PlZiekt.*, li, 4, pp. 93–115, 1 pl., 5 graphs, 1945. [English summary.]

The writers' investigations on blossom-end rot of the tomato in Westland, Holland, were primarily concerned with the influence on the disorder of the type and properties of the soil. The plants were grown in pots containing (*a*) peat, (*b*) sand with an admixture of humus, and (*c*) clay of little buffering capacity, all adjusted to three pH values, acid, medium acid, and alkaline: to these were added single or compound fertilizers, the former consisting of 30 gm. ammonium sulphate, 42 gm. superphosphate, and 28 gm. potassium magnesium sulphate and the latter of 26 gm. potassium nitrate and 14 gm. diammonium phosphate. During growth the salt concentration sank appreciably. Blossom-end rot assumed a very severe form at first, especially on soils of a low pH with a high salt concentration [*R.A.M.*, xxi, pp. 393, 541; xxiii, p. 502], but later it virtually disappeared. In this experiment soil type exerted little influence on the incidence of the disorder because its effects were neutralized by differences in the hydrogen-ion concentration. The combination of a low pH and a high salt concentration markedly increased the incidence of blossom-end rot, and except on peat the interaction between these two factors tended to intensify the adverse effects of each.

Andrus (C. F.). **Resistance of Tomato varieties to late blight in South Carolina.**—*Plant Dis. Reptr*, xxx, 8, pp. 269–270, 1946. [Mimeographed.]

During a severe epidemic of tomato late blight (*Phytophthora infestans*) in South Carolina during May, 1946, the following varieties were found to be resistant: Adelaide Dwarf, Australian Earliana, Burwood Prize, Chemin Early Red, Danish Extra Early, Determinate Shipper, Dobbie's Champion, Dobbie's Holyrood, Dwarf Earliest Red, Garden State, Marvana, Potentate, Primrose Gage, San Marzano, Ventura, Vetomold, and Westlandia.

Cass Smith (W. P.) & Goss (O. M.). **Bacterial canker of Tomatoes.**—*J. Dep. Agric. W. Aust.*, xxiii, 2, pp. 147–156, 7 figs., 1946.

Bacterial canker of tomatoes (*Aplanobacter* [*Corynebacterium*] *michiganense*) was first recorded for Western Australia in December, 1945, in the Wanneroo and Balcatta areas and was subsequently identified from the Denmark and Coogee districts. The disease is believed to have been introduced in seed stocks from the eastern States of Australia [*R.A.M.*, xviii, p. 279; xxiii, p. 155], three badly infested and widely separated crops of the Tatura variety being traced to the same sources of seed. The widespread practice of using home-produced seed should do much to prevent spread and to assist control of the disease. Dissemination either in seed-bed or field may take place by handling a diseased seedling prior to a healthy one during transplanting; during pruning [ibid., xxiii, p. 414], when cutting of a diseased plant may cause transmission to subsequently cut healthy ones; and by splashes from sprinklers and rain, particularly when wounds are present, which on fruit may cause surface spots and lower the market value. The disease may persist in the soil and infect the following crop.

As primary dissemination is due to infected seed it is imperative that seed should be saved only from crops entirely free from *C. michiganense*. Seed should be extracted by fermenting the pulped fruit without water for four days in a cool, shady place, the fermenting material being stirred night and morning to submerge floating pulp. Purchased seed or seed unavoidably saved from crops found to be even lightly infected should be sterilized by steeping for 25 minutes in water at 122° F. or for 24 hours in 0·6 per cent. glacial acetic acid solution (1 fl. oz. acid per gal.

water). Hot-water treatment is effective against all other seed-borne tomato diseases. Seed should be well dried after treatment and dusted before planting with spergon or any organic mercury dust, such as ceresan or agrosan. Diseased crop refuse should be burned, not ploughed in, owing to the viability of the pathogen for at least two years in the soil. Infested land should not be used for tomatoes for at least three years. Seed-bed sites should be changed at each planting and permanent seed-boxes should be drenched with 2 per cent. formalin (1 gal. commercial formalin in 49 gals. water) or 2 per cent. copper sulphate (1 lb. in 5 gals.). When a diseased plant is cut during pruning, hands and knives should be washed in soapy water; diseased plants should be rogued and burned.

The pathogen was most easily isolated from the expressed sap of petioles of newly infected leaves by plating on potato dextrose or potato dextrose-peptone agar. The reactions obtained agreed closely with those for *C. michiganense*, except that the organism failed to liquefy gelatine. Needle inoculation tests through the stem bases of healthy plants induced clear symptoms of *C. michiganense* after 12 days, the lower leaves wilting and beginning to wither. Death of the plants occurred in 32 days, the controls remaining uninfected. An organism identical in all respects with the original was recovered from the petioles.

In seed-treatment experiments exposure to water at temperatures of 50° or over for 25 minutes [cf. ibid., xxv, p. 530] exterminated the canker organism in water suspension; seed suffered no loss of germination capacity nor injury to subsequent growth.

Palti (J.) & Chorin (M.). **Leaf mould (Cladosporium fulvum) of Tomatoes.**—*Hassadeh*, xxvi, pp. 449–450, 2 figs., 1946. [Hebrew.]

Tomato leaf mould (*Cladosporium fulvum*) [*R.A.M.*, xxiv, p. 343] appears in the coastal regions of Palestine in early July, in Upper Galilee during the late summer, and in the Jordan Valley in the winter and spring. The Marmande, Stoffert's Immun, and Devon Surprise varieties are the most susceptible. An important control measure consists in the avoidance of excessive irrigation, which promotes the high humidity favouring the spread of the disease. Sulfinette or cita Californian spray at 1·5 per cent. are effective against leaf mould alone, but if other pathogens, e.g., *Alternaria* [*solani*] and *Septoria* [*lycopersici*], are to be simultaneously combated, dilute copper sprays, such as 0·75 per cent. Bordeaux or 0·25 per cent. perenox, should be used. Where the disease is prevalent, the treatments should begin four to five weeks after planting and be repeated at 5- to 7-day intervals during active growth and thenceforward every 7 to 10 days.

Mix (A. J.). **Observations on some species of Taphrina.**—*Plant Dis. Reptr*, xxx, 8, pp. 280–282, 1946. [Mimeographed.]

Short notes are given on infections of *Prunus* and *Quercus* spp. by species of *Taphrina* noted in Kansas during 1946, including *T. caerulescens* on the latter hosts.

Clapper (R. B.), Gravatt (G. F.), & Stout (D. C.). **Endothia canker on post Oak.**—*Plant Dis. Reptr*, xxx, 10, p. 381, 1946. [Mimeographed.]

Endothia parasitica [*R.A.M.*, xxv, p. 15] is reported as the cause of severe damage of post oak (*Quercus stellata*) at Port Republic and many other places in Maryland, Mt. Vernon and elsewhere in Virginia, in the District of Columbia, and southern Pennsylvania, while infected post oaks were noted at Roanoke, Virginia, Knoxville, Tennessee, New Haven, Connecticut, and Athens, Georgia. In a single area in Connecticut over 30 per cent. of the trees were attacked. American and Asiatic chestnuts were successfully inoculated with the fungus from post oak.

Frezzi (M. J.). **La presencia del 'Fusarium bulbigenum v. blasticola' en la República Argentina.** [The presence of *Fusarium bulbigenum* var. *blasticola* in the Argentine Republic.]—*Physis, B. Aires*, xv, 47, pp. 87–97, 6 figs., 1939. [Received September, 1946.]

This is an abridgement of a thesis presented by the author to the University of La Plata in 1935 on the symptomatology, etiology, pathogenicity, cultural characters, and control of *Fusarium bulbigenum* var. *blasticola* [cf. *R.A.M.*, xvii, p. 368], the agent of damping-off in *Pinus pinea* and other *P.* and *Cupressus* spp., reported for the first time from Argentina. The fungus produces continuous, hyaline, granular macro- and microconidia, the former measuring 11·25 to 26·25 by 3·75 to 5·6 and the latter 6·75 to 7·5 by 3 to 3·75 μ; these organs develop in profusion in 48-hour cultures at 21° C. on 1 per cent. potato dextrose, malt extract, and maize agars throughout a pH range of 5·1 to 9·2. The cream-coloured sporodochia, appearing between the 20th and 30th days of culture, also give rise to macro- and microconidia; the former are fusoid, curved, pedicellate, predominantly tri-, sometimes quadri- or quinqueseptate, and measure 34 to 41·5 by 3·5 to 4·5 μ, and the latter ovoid, 4·5 to 5·5 by 3·5 to 5 μ. The spherical, smooth, mustard-coloured chlamydospores occupying the centre, or occasionally one of the extremities, of the macroconidia measure 7·5 to 10·5 μ in diameter; they germinate immediately on liberation by means of a slender, hyaline, septate germ-tube, which in turn produces an abundance of hyphae, 4 to 5·2 μ in diameter, and the original conidial phase.

Inoculation experiments on *P. pinea* seedlings induced the typical symptoms of damping-off, the wet, dark chestnut-coloured rot progressing slowly upwards and downwards; the dense, whitish, velvety hyphae developing on the necrotic areas serve to differentiate the infection from that caused by other *F.* spp. or *Pythium ultimum*.

A scheme for the control of the disease based on North American experience is outlined.

Lombard (Frances F.) & Davidson (R. W.). **An undescribed Coryneum on diseased Italian Cypress.**—*Phytopathology*, xxxvi, 9, pp. 775–777, 1 fig., 1946.

Coryneum asperulum n.sp. was found on dead terminal buds, leaves, and branchlets of an Italian cypress (*Cupressus sempervirens*) near Montgomery, Alabama, but evidence of its pathogenicity is not yet forthcoming. The acervuli of the fungus, which are sparsely distributed over the leaf surfaces, are black, erumpent, pulvinate, usually circular, 50 to 200 μ in diameter, and the conidia oblong to fusoid, slightly roughened, typically triseptate, olive-grey, 27 to 32 by 5 to 6 (range 19 to 40·6 by 3·6 to 6) μ, borne on short, simple conidiophores; paraphyses are absent.

Of the twelve species of *Coryneum* previously described on conifers, two occur on cypress, namely, *C. cardinale* on *Cupressus macrocarpa* and other *C.* spp. [*R.A.M.*, xviii, p. 492] and *Coryneum berckmanii* on *Cupressus sempervirens* var. *stricta* [ibid., xix, p. 684]. Both these species differ from *Coryneum asperulum* in their quinqueseptate spores, and in fact, only three of the twelve reported on conifers belong to the triseptate group, namely, *C. bicorne* on *Abies pectinata* in Denmark, *C. thyicolum* on *Thuja occidentalis* in Sweden, and *C. cinereum* on *Pinus contorta* and *P. murrayana* in Oregon and Colorado: *C. asperulum* differs from these in the shape and size of its conidia.

Brunstetter (B. C.), Myers (A. T.), Lambert (M. L.), & Buchanan (T. S.). **The chloride content of conifers.**—*Science*, civ, 2705, pp. 415–416, 1946.

The analysis for chlorides of 68 samples of shortleaf pine (*Pinus echinata*) needles, collected in 1942 from the previous year's middle-crown growth in 15 localities of six southern States of the American Union, disclosed no apparent correlation between chloride content and 'little leaf' [*R.A.M.*, xxv, p. 297].

Verrall (A. F.). **Preservative treatments for use on wood off the ground.**—*Agric. Engng, St. Joseph, Mich.*, xxvii, 8, pp. 367–370, 2 figs., 1946.

Cold soak and brush treatments with 5 per cent. pentachlorophenol and copper naphthenate (4·5 per cent. for the former and 18 for the latter method) and a cold soak with 0·2 per cent. phenyl mercuric oleate were applied to southern yellow pine sapwood in specially designed units exposed outdoors, above ground, and subject to rain seepage at joints, at the Harrison Experimental Forest, near Saucier, Missouri. The periods of immersion in soak treatments were 15, 30, or 60 minutes, or alternatively two coats were given with a paint-brush at an hour's interval, all the solutions being applied at air temperature. After 3½ to 4 years' exposure there was no appreciable difference in efficacy between the two methods of treatment or the three periods of immersion. Some evidence was obtained that the treatments not only prevent early decay (largely due to *Lenzites sepiaria*), but tend to retard the discoloration of painted surfaces by the black mould [? *Cladosporium herbarum* var. *nigricans*: *R.A.M.*, xxv, p. 177] prevalent in the Gulf States; they should not, however, be relied upon as substitutes for ordinary control measures in localities where paint moulding is severe.

Flügge (R.). **Die gesamte Schutzbehandlung des Bauholzes. Zweite, erweiterte Auflage.** [The general protective treatment of timber. Second, enlarged edition.]—132 pp., 49 figs., 5 diags., Halle (Saale), Carl Marhold Verlagsbuchhandlung, 1943. [Received November, 1946.]

The author has assembled and condensed much valuable information concerning various aspects of timber protection, including the control of fungal rots, with special reference to war conditions in Germany and the countries annexed or occupied at the time of publication.

Taylor (C. F.) & Rupert (J. A.). **A study of vegetable seed protectants.**—*Phytopathology*, xxxvi, 9, pp. 726–749, 9 graphs, 1946.

Using refined methods of technique, the writers made a study, at the West Virginia Agricultural Experiment Station in 1942–3, of the comparative value of numerous chemicals applied as dusts to vegetable seeds for the control of damping-off, caused principally by *Pythium ultimum* [cf. *R.A.M.*, xxiii, pp. 507, 509].

Arasan and other mixtures of tetramethyl thiuramdisulphide, e.g., thiosan (now known as tersan [ibid., xxv, p. 397]), were the most effective and persistent of the fungicides tested on spinach [ibid., xxiii, p. 328; xxiv, pp. 1, 365], cucumber, carrot, cabbage, and tomato [ibid., xxiii, p. 371]. Lettuce responded more favourably to cuprocide and was liable to injury from arasan and fermate; in other cases the last-named approximated to arasan in efficiency. The protective action of cuprocide was generally of brief duration, and silver oxide is open to a similar objection; silver chromate at very high dosages gave satisfactory control. Spergon proved unsatisfactory as a seed-protectant in these studies.

Luttrell (E. S.). **A pycnidial strain of Macrophomina phaseoli.**—*Phytopathology*, xxxvi, 11, pp. 978–980, 1946.

A strain (No. 75) of *Macrophomina phaseoli* producing pycnidia and pycnospores, 14 to 30·8 by 7 to 11·2 μ, on agar media was isolated in 1944 at the Georgia Experiment Station from the hypocotyl tissue of a snap bean [*Phaseolus vulgaris*] seedling with symptoms of charcoal rot [*R.A.M.*, xxiv, pp. 270, 303]. A year later 20 single pycnospore isolations were made from the same strain, all of which resembled the original and produced pycnospores in culture. No. 75 is the only one of 58 isolates examined in the course of a study on *M. phaseoli* to form pycnidia on agar media. Of various other methods tried for this purpose, the most satisfactory consisted in

the inoculation of sterilized 10-in. lengths of dried bean stems inserted in large culture tubes with their bases immersed in water to a depth of 2 in. Of 35 isolates (17 from Georgia and 18 from other States) tested in this way, 20 formed pycnidia, often elongated, compound, coralloid structures projecting above the sclerotial crusts scattered along the stems, within a month. The length of the pycnospores ranged from 14 to 33·6 and their width from 5·9 to 11·8 μ, and the hosts (besides bean) producing them were cowpea, Lima bean [*P. lunatus*], *Cassia nictitans*, *Crotalaria intermedia*, *Lespedeza* sp., *Lactuca scariola*, coffee weed [*Ditremexa occidentalis*], sweet potato, cantaloupe, tomato, maize, and sorghum [ibid., xxiv, p. 96]. Inoculations with pycnospore suspensions from cultures of strain No. 75 on unwounded stems and leaves on Tendergreen snap bean plants of all ages resulted after incubation in a moist chamber in the development of typical symptoms within a fortnight. The use of pycnospore suspensions gave uniformly successful results when other methods of inoculation failed.

Townsend (G. R.), Emerson (R. A.), & Newhall (A. G.). **Resistance to Cercospora apii Fres. in Celery (Apium graveolens var. dulce.).**—*Phytopathology*, xxxvi, 11, pp. 980–982, 1 fig., 1946.

Of 48 foreign collections of celery tested for their reactions to early blight (*Cercospora apii*) at the Everglades Experiment Station, Belle Glade, Florida, in 1940–1, seven varieties of Turkish origin remained free from the disease and produced vigorous plants. During 1943–4 the F_1 plants from four crosses between two resistant Turkish lines and Cornell 19 were kept in a greenhouse at Cornell University, and in the following winter nine F_2 selections from these crosses were grown in the field in Florida. Most of the plants in these lines combined horticulturally attractive characters with resistance to *C. apii*, and 17 out of 28 sent to Ithaca, New York, in March, 1945, produced seed, as also did 19 other F_2 lines selected at Ithaca the previous summer. Of 35 F_3 lines grown in Florida during the winter of 1945–6, eight developed less infection than is usually found in well-sprayed fields of the uniformly susceptible native American varieties. Several of the selections are of high quality, with very heavy, crisp petioles, predominantly of the green colour generally associated with resistance to *C. apii*, which is attributed to more than one genetic factor.

Smith (M. A.). **Bacterial spot of Honeydew Melon.**—*Phytopathology*, xxxvi, 11, pp. 943–949, 1 fig., 1946.

A hitherto unreported disease of honeydew melons (*Cucumis melo* var. *inodorus*), part of a Colorado consignment arriving at Chicago in September, 1944, is described. The morphological characters of the organism isolated from the slightly sunken, circular to oblong, water-soaked, greenish-tan spots, 2 to 6 mm. in diameter, or coalescent, and brown to black, on the diseased fruits were compared with those of *Pseudomonas lacrymans* [*R.A.M.*, xi, p. 18; xiii, p. 419] and found to be indistinguishable, while further evidence of identity was afforded by the results of cultural and biochemical tests with both bacteria. Moreover, cross-inoculation experiments on honeydew melons and cucumbers with the isolate from the former and *P. lacrymans* showed that both organisms were pathogenic to the fruits, leaves, and stems of the two hosts. It is proposed, therefore, to refer the honeydew melon bacterium to *P. lacrymans*.

Jenkins (J. M.). **Studies on the inheritance of downy mildew resistance and of other characters in Cucumbers.**—*J. Hered.*, xxxvii, 9, pp. 267–271, 2 figs., 1946.

This study of resistance to downy mildew (*Peronoplasmopara* [*Pseudoperonospora*] *cubensis*) of cucumbers [*R.A.M.*, xxi, p. 317] and its mode of inheritance in a cross between Puerto Rico No. 37 and a susceptible inbred line Minnesota No. 36

suggested the desirability of using in the F_2 and later generations relatively large seedling populations, which should be inoculated at this stage and susceptible plants removed before transplantation to the field. This would have the effect of limiting the field populations to those individuals with seedling resistance, these almost invariably showing field resistance also, after which selections in the field for desirable commercial characters and resistance to *P. cubensis* should prove possible. Among the F_3 lines, one exhibited an average resistance similar to that of the resistant parent.

PIZER (N. H.). **The value of ground gypsum in making Mushroom composts.**— *Mushroom Gr. Yearb., 1946*, pp. 41–43, 1946.

In the course of this popular account of the value of ground gypsum in mushroom composts [*R.A.M.*, xviii, p. 229] the author questions some variations of practice instituted since he first described the treatment ten years ago and still recommends that the product should be added when the manure is first shaken out and made into a heap for composting.

LING (L.) & LIN (K. R.). **On the occurrence of Colletotrichum capsici in China.**— *Indian J. agric. Sci.*, xiv, 2, pp. 162–167, 1 fig., 1 map, 1944. [Received November, 1946.]

The first record of *Colletotrichum capsici* in China was made by Sydow (*Ann. mycol., Berl.*, xvii, pp. 140–143, 1919) from Canton, and it was again reported by Teng (*Sinensia*, ix, pp. 219–258, 1938) as occurring in Kwangsi. It has recently been found causing a ripe rot of chilli, eggplant, and tomato fruits in Chengtu Plain, Szechuan Province. The fungus appears to be restricted to tropical and subtropical regions, and except for Buenos Aires, Argentina (latitude 35° south), where it has been observed on chilli, *C. capsici* is found exclusively within the zone northward from the equator to latitude 32°.

The morphological features of the authors' isolates from the three above-mentioned hosts were in close mutual agreement and also approximated to those described by Dastur from India [*R.A.M.*, i, p. 195]. Some differences were noted, however, in the mode of germination of the three strains. The germ-tubes of the chilli isolate are broader than those of the other two and branch profusely at an early stage, while the germ-tubes of the tomato and eggplant strains usually grow for several hundred microns before branching; appressoria were formed only by the tomato isolate. The cultural characters on standard media, of which potato dextrose agar proved to be the most suitable, are essentially similar to those of *Glomerella glycines* from soy-bean [ibid., xix, p. 512] and *C. truncatum* [ibid., xv, p. 272] from garden bean [*Phaseolus vulgaris*]. Conidia were produced from the aerial hyphae but tended to be smaller than those originating in the acervuli.

In comparative inoculation experiments with *C. capsici*, *C. indicum* [ibid., xxiv, p. 148], and *G. glycines*, the first-named readily attacks its natural hosts, tomato, chilli, and eggplant. As already shown by Higgins [ibid., x, p. 56], the immature chilli fruits are as susceptible to infection as older ones, but the rot does not develop until they ripen. Inoculation of the inflorescences results in blossom blight, but the die-back phase of the disease, reported to be prevalent in India, has not been observed in China either on naturally or artificially infected plants. Inoculated into detached fruits or tubers, the three isolates of *C. capsici* and *G. glycines* were alike pathogenic to tomato, chilli, eggplant, and soy-bean, but not to potato and cotton, whereas *C. indicum* attacked all the experimental plants except potato and caused decay of cotton bolls. *C. capsici* is readily distinguishable from the other two species by its incapacity to infect its natural hosts in the seedling stage. Of the plants reported by Sundararaman [ibid., vii, p. 678] to be susceptible to *C. capsici*, the yellowing basal leaves of cabbage and the detached fruit clusters of *Solanum*

nigrum and *Datura album* rapidly contracted infection, whereas plants in active growth remained immune.

The taxonomy of *C. capsici* is briefly discussed in relation to its position within the group of species characterized mostly by falcate conidia and dense stromata. Only in one representative of the group, *G. glycines*, has the ascigerous stage been discovered, and the taxonomy of the others, based on the imperfect state alone, is still very obscure.

Person (L. H.). **The soil rot of Sweet Potatoes and its control with sulphur.**—*Phytopathology*, xxxvi, 10, pp. 869–875, 1946.

Soil rot of sweet potatoes (*Actinomyces ipomoea*) [*R.A.M.*, xxiv, p. 352], which has caused heavy losses since 1934 in Louisiana soils with a pH of 5·6 to 5·8, has been effectively combated by the application of sulphur at 600 to 800 lb. per acre, resulting in the reduction of the pH to 5 and its maintenance at that level for four to six years. The treatment has virtually eliminated losses from the disease, and in fact, in the better fields increases of 120 to 160 crates per acre from the areas receiving sulphur are not uncommon. Low rainfall at the time of root production by the young plants aggravated the intensity of soil rot during the period of observation, damage from this source having been negligible in very wet seasons.

Venkatarayan (S. V.). **A natural fungous parasite of powdery mildew on Cyamopsis psoraloides DC.**—*Curr. Sci.*, xv, 11, p. 319, 1946.

The powdery mildew, *Leveillula* [*Oidiopsis*] *taurica*, which developed in profusion on the cluster bean (*Cyamopsis psoraloides*) in Bangalore in September and October, 1946, was found to be parasitized by *Cicinnobolus cesatii* [*R.A.M.*, xxiv, p. 476]. The hyperparasite is listed by Butler and Bisby [ibid., xi, p. 545] as occurring on *Oidium* in India, but this record is the first of its presence on *Oidiopsis taurica* in the country. Under favourable conditions the mildew causes considerable defoliation, so that the inhibitory properties of its parasite are evidently only moderate, though probably sufficient to arrest the full development and spread of the fungus.

Luttrell (E. S.). **Black rot of Muscadine Grapes.**—*Phytopathology*, xxxvi, 11, pp. 905–924, 3 figs., 1946.

Black rot is a prevalent and conspicuous disease of muscadine grapes (*Vitis rotundifolia*) in Georgia [*R.A.M.*, xxv, p. 332], primarily affecting the vegetative system. It causes a leaf spot, canker or blight of the petioles, tendrils, stems, and flower clusters, and a superficial scab or canker of the berries, but does not appreciably impair the yield. Muscadines vary considerably in their reaction to black rot, Dulcet and Thomas, for instance, having relatively resistant foliage and quasi-immune berries; they are, however, less productive than the susceptible Hunt.

Guignardia bidwellii f. *muscadinii* n.f., the agent of muscadine grape black rot, is distinguishable in pathogenicity from *G. bidwellii*, which causes complete mummification of bunch grapes, but the associated morphological differences, both in nature and in culture, are only slight. The new form grows less rapidly than the species proper, and its perithecia are smaller (61·2 to 112, mean 84·3, compared with 95·2 to 198·8, mean 146·5 μ), the ascospores larger (13·5 to 17·3 by 6 to 9, mean 14·9 by 7·2, as against 11·3 to 16·5 by 6 to 6·8, mean 13·5 by 6·6 μ), and the pycnospores longer (8 to 13·3 by 6 to 6·7, mean 9·3 by 6·3, and 8 to 12 by 6·4 to 6·7, mean 8·5 by 6·6 μ, respectively).

In cross-inoculation tests on bunch and muscadine grapes, both *G. bidwellii* and its f. *muscadinii* proved capable of attacking a European variety of the former (*V. vinifera*), but the new form was innocuous to the native Warren and Niagara (*V. bourquina* Munson ex Viala and *V. labrusca*, respectively), and the species

proper did not infect muscadines. The genetic connexion of the pycnidial and perithecial states of both pathogens was also demonstrated by these experiments.

The results of spraying tests did not encourage the general adoption of the practice for black-rot control on muscadines, which can be achieved by sound cultural measures, such as selection of appropriate vineyard sites and rational methods of cultivation, soil amendment, pruning, and sanitation.

Adam (D. B.). **Downy mildew of the Vine.**—*J. Dep. Agric. S. Aust.*, l, 2, pp. 91–95, 5 figs., 1946.

Vine downy mildew [*Plasmopara viticola*], which was first recorded in Australian commercial vineyards in 1917 in the Rutherglen region of Victoria, appeared in the Clare and River Murray districts of South Australia in 1921 and recurred in a mild form in succeeding years until 1925. Since that date there had been no reports of the disease in the latter State until February, 1946, when a severe outbreak occurred in the comparatively small and isolated settlement of Coonawarra, where extensive leaf injury and defoliation, combined with adverse seasonal conditions, greatly impaired the value of the crop for wine manufacture. The symptoms of the disease, the influence of weather on its development, and the life-history of the causal organism are described in popular terms, and an outline of the standard control measures employed in other countries is given.

Jensen (D. D.). **Virus diseases of plants and their insect vectors with special reference to Hawaii.**—*Proc. Hawaii. ent. Soc.*, xii, 3, pp. 535–610, 1946.

This presidential address to the Hawaiian Entomological Society, delivered on 10th December, 1945, falls into three parts, namely, (I) principles of insect transmission of plant viruses; (II) insect species occurring in Hawaii known to transmit plant viruses, with a list of viruses transmitted by each; and (III) plant virus diseases known or reported to occur in Hawaii with special reference to their transmission by insects. Most of the papers listed in the bibliography of 251 titles have been noticed in this *Review* from time to time.

Ciferri (R.). **Relazione sull' attività del Laboratorio Crittogamico, dell' Osservatorio Fitopatologico e del Centro Studi sugli Anticrittogamici durante gli anni 1944 e 1945.** [Report on the activity of the Cryptogamic Laboratory, the Phytopathological Observatory, and the Centre for Studies on Fungicides during the years 1944 and 1945.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, v (3), pp. 279–321, 1946.

This report [cf. *R.A.M.*, xxv, p. 251] contains, *inter alia*, the following items of interest. In northern Italy the most prevalent rice disease is blast (*Piricularia oryzae*) [ibid., i, p. 343; xviii, p. 580]. Infection by a *Helminthosporium*, probably *H. oryzae* [*Ophiobolus miyabeanus*: ibid. ix, p. 200], is almost as widespread, but much less serious in its effects. Lupins (*Lupinus densiflorus* and *L. polyphyllus*) growing in the Botanical Gardens, Pavia, were attacked by *Ceratophorum setosum* [ibid., vii, p. 582; xxi, p. 293]. *Taraxacum kok-saghyz* was attacked by *Puccinia taraxaci*, which the author, following Trotter (Uredinales, 140, 1908), regards as distinct from *P. hieracii* [*R.A.M.*, xxiv, p. 4], and by *Ramularia taraxaci*.

A study of the fungus causing 'mal secco' disease of citrus (*Deuterophoma tracheiphila*) [ibid., xxv, p. 497] made on different lemon varieties from various parts of Sicily showed it to be identical with Diedicke's generic description of *Bakerophoma*; comparison with the type species could not be made, but the author considers that the new combination *Bakerophoma tracheiphila* (Petri) Ciferri is justified.

As the apple rot fungus *Sphaeropsis malorum* Berk. [*Diplodia mutila* (Mont.) Fr. 1834, the pycnidial stage of *Physalospora mutila* (Fr.) N. E. Stevens: ibid.,

xiii, p. 312; xv, p. 726] can be placed in the genus *Botryodiplodia*, and a comparison of it with exsiccata of *Labrella pomi* Mont. & Fr. from the collections of Roumeguère and Cavara & Pollacci showed them to be the same, and as the date of Fries's binomial (1834) is anterior to Berkeley's (1836), the author considers that the erection of the new combination *B. pomi* (Mont. & Fr.) Ciferri is justified.

Attention is directed to the necessity of undertaking a thorough study of chestnut blight (*Endothia parasitica*) as it exists in Italy [ibid., xxvi, p. 85].

Mundkur (B. B.). **Report of the Imperial Mycologist.**—*Sci. Rep. agric. Res. Inst., New Delhi, for the triennium ended 30th June, 1944*, pp. 57–63, 1946.

In this report [cf. *R.A.M.*, xxvi, p. 44] it is stated that in inoculation tests carried out in 1942–3 with 129 wheat varieties 53 took no infection by *Urocystis tritici*, 19 became slightly affected, and the remainder showed high infection. Similar results were obtained in 1943–4. In two years' trials, very fine sulphur dust and dust made from Baluchistan sulphur ore considerably reduced barley covered smut (*Ustilago hordei*) [ibid., xxiv, p. 361]. Of 20 pigeon pea (*Cajanus cajan*) varieties tested in 1942–3 in pots against wilt (*Fusarium udum*) [ibid., xx, p. 496], one, A. 126–4–1 remained unaffected. In 1943–4, IP 80, IP 41, C. 38, C. 15, A. 126–4–1, D. 16–17–2 pt. 12, and D. 33–4–22 were resistant. Bulsar White, reputedly resistant, was severely infected. On field plots inoculated with cultures of the fungus and infected debris, IP 80, IP 41, C. 38, C. 15, and A. 126–4–1 maintained their resistance.

In further experiments on the effect of sowing date on the incidence of gram (*Cicer arietinum*) wilt (*Fusarium orthoceras* var. *ciceris*) [ibid., xxiii, pp. 325, 425], the crop sown in September, [? 1942], was almost destroyed by the disease, which, however, was much less in the October sowings. Early sowing was also found to favour attack by foot rot (*Operculella padwickii*) [ibid., xxi, p. 120]. When *Trichoderma lignorum* [*T. Viride*] was mixed with soil highly infested with *O. padwickii*, no reduction in infection of the gram was observed over a period of three years. In 1943–4 the general level of infection was rather higher in plants from non-vernalized seed than from vernalized.

In the 1941–2 season incidence of potato virus diseases was highest from early February to mid-March. Incidence and severity of infection were much lower on the Himalayan foothills than in the plains. In 1943–4 a nucleus of disease-free tubers of important commercial varieties from severely rogued crops was planted at Kufri, 8,000 ft. above sea-level, the site selected for the Central Station for Seed Potato Certification.

Tomato big bud [ibid., xx, p. 182], due to *Lycopersicum* virus 5 [tomato big bud virus], was recorded for the first time in India [see above, p. 135].

A very virulent strain of sugar-cane red rot (*Colletotrichum falcatum*) [*Physalospora tucumanensis*: ibid., xxi, p. 348; xxii, p. 408; xxvi, p. 45] was isolated in 1941–2; of 79 varieties inoculated with it, 36 were moderately resistant, 30 moderately susceptible, and 13 highly susceptible. In the resistant varieties the reddening produced was not more than 15 in. long, whereas in the susceptible ones it sometimes reached a length of 60 in. Of 98 varieties tested in 1942–3 and 116 in 1943–4, 22 showed moderate resistance in each trial. Two physiologic races were found, the light, highly pathogenic one mentioned above, and the common, dark, less virulent one. Some subcultures from the light-coloured race were only weakly pathogenic while the dark one gave sometimes more virulent ones.

A thorough inspection of rice leaves and seeds from all parts of India, allegedly infected by *Helminthosporium oryzae* [*Ophiobolus miyabeanus*: ibid., xxv, p. 317], showed that more than half were infected by *Curvularia* [? *spicifera*: cf. ibid., xix, p. 258] and only just over a quarter by *O. miyabeanus*.

Hansford (C. G.). **Annual Report of the Senior Plant Pathologist.**—*Rep. Dep. Agric. Uganda, 1944–45* (Part II), pp. 1–4, 1946.

In this report [cf. *R.A.M.*, xxv, p. 27] it is stated that the virus disease of sweet potatoes present in Uganda [ibid., xxiv, p. 117; xxv, pp. 100, 154] shows great variation in its incidence on different varieties and in the severity of the symptoms thereon. Work has been started to ascertain if more than one virus is concerned. The most susceptible period in the growth of the plant appears to be during the first two months after planting the cuttings; after the plants have begun to form a ground cover, spread is extremely slow. Most diseased cuttings quickly die, while even in favourable weather conditions it is very difficult to raise plants from infected cuttings of very susceptible varieties. Wild *Ipomoea* spp. and related plants when grown in the vicinity of affected sweet potatoes showed similar symptoms. Attempts are being made to discover a source of high resistance.

Some sweet potato varieties at Kawanda show a severe stem rot, characterized by superficial black lesions which later deepen and render the stem brittle. Among the fungi isolated was a species of *Plenodomus* more or less corresponding to *P. destruens* [ibid., xxiv, p. 442]. Although the disease is widespread it is unlikely to affect the native crop as a whole owing to the use of resistant varieties.

During the long droughts of recent years banana leaf spot (*Cercospora musae*) [*Mycosphaerella musicola*: ibid., xxiii, p. 410] has become common round Kampala. A rot of the banana heart leaf due to *Helminthosporium musae-sapientum* [ibid., xxiii, p. 409] was noted occasionally. The fungus attacks at some point within the heart of the plant before the leaf has expanded. Infection begins as a water-soaked spot on the leaf blade and spreads to adjacent portions of the tightly rolled leaf, resulting in a band of infected tissue running for some distance down the leaf. Later, the distal part withers.

Blight (*Phytophthora*) [*infestans*] of Irish potatoes is still of major importance in the higher parts of Uganda, particularly in Kigezi and Toro. *Alternaria* blight [*A. solani*], often accompanied by *Cercospora* [? *concors*: ibid., xxiii, p. 410], is the most usual potato disease at Kawanda.

One field of Co. 290 sugar-cane showed heavy leaf spot infection by *C.* [? *longipes*: loc. cit.] without, however, any effect on the yield.

In the section of this report dealing with work on cotton (pp. 36–40), P. E. Weatherley states that in further studies on resistance to blackarm [*Xanthomonas malvacearum*: ibid., xxv, pp. 27, 499] of 114 selected strains, representing 33 varieties sprayed with a suspension of the organism, 28 were selected for possible future use, and 13 for further increase. Markedly resistant progenies of resistant phenotypes selected from the F_2 generation between BP 52 and N 17 were shown to be homozygous and no further elimination is necessary. In variety trials routine lesion counts revealed that resistant selections bear less than half the number of lesions recorded on the parental types. B 181 and its resistant derivatives continued to give the highest yield and always had fewer blackarm lesions than four other varieties tested at 19 centres; BP 50R grown at 17 centres came next in lesion counts, equalled B 181 in yield, and gave the strongest yarns.

Report of the Agricultural Department, Dominica, 1945.—12 pp., [? 1946].

The following notes on plant diseases occur on p. 6 of this report [cf. *R.A.M.*, xxiv, p. 7]. The incidence of withertip of limes (*Gloeosporium limetticola*) did not exceed the average.

W. T. Dale, of the Mycology Department, Imperial College of Agriculture, Trinidad, who visited Dominica from 15th June to 9th July, 1945, to study vanilla diseases, found a root rot to be the principal limiting factor in the cultivation of the crop. Infected material yielded a species of *Fusarium* closely resembling

F. batatatis var. *vanillae* [ibid., xiii, p. 58]. Pending further information control should be based on the use of healthy setts for planting, provision of the right amount of shade, avoidance of over-pollination of flowers, and the application of crushed limestone at the rate of 6 lb. per plant on heavy clay, acid soils and in smaller quantities on lighter and less acid ground.

W. T. Dale also made a survey of the cacao plantations and found the health of the crop reasonably satisfactory. The most serious trouble is the root rot caused by *Rosellinia* spp., while *Phytophthora palmivora* is responsible for slight damage in the wetter districts. *Inga* spp., breadfruit [*Artocarpus communis*], and avocado are highly susceptible to the *Rosellinia* root rot and should be excluded from the vicinity of new cacao plantings.

The average monthly incidence of Panama disease of bananas (*F.* [*oxysporum* var.] *cubense*) was 8·52 per cent. infected stools compared with 2·55 per cent. in the previous year.

The tobacco-mosaic virus was present in a high proportion of the plants at Hillsborough Estate.

Annual Report of the Agricultural Experiment Station, Florida, for the year ending June 30, 1945.—229+vii pp., 13 figs., 1 diag., 8 graphs, [? 1946].

In the plant pathology section (pp. 89–98) of this report [cf. *R.A.M.*, xx, p. 562] investigations by E. West into the host relations and factors influencing the growth and pathogenicity to lupins of *Sclerotium rolfsii* [ibid., xxiv, p. 20; xxv, p. 20] showed that more plants survived in field sand than in mixtures with leaf mould. This suggests that *S. rolfsii* spreads more quickly in soil containing organic matter. Stock cultures of 14 *S. rolfsii* strains and variants (some of which had been in culture for several years) proved equally pathogenic to lupin seedlings.

W. B. Tisdale, A. N. Brooks, and A. L. Harrison investigated the causes of failure of seed and seedlings in various Florida soils and devised methods for preventing it. Arasan, 2 per cent. ceresan, Dow 9B and 1452–F, both at 0·25, and a copper bronze powder at 0·5 per cent. were used on seed sown in soil inoculated with *Pythium irregulare* and *P. splendens*, of which the former was much the more virulent to lettuce; all treatments proved more effective against the latter. Emergence of arasan-treated lettuce seed in soil infested with *P. irregulare* amounted to 41·6 per cent. as against 0·6 from untreated seed. Other treatments were inferior but all gave significant increases except Dow 9B. In soil inoculated with *P. splendens* emergence from untreated seed was 40 and from that treated with arasan and 1452–F 78 and 79 per cent., respectively. Other treatments were less effective. In similar experiments *P. splendens* proved to be more virulent to spinach than *P. irregulare*, against which, however, arasan alone proved effective [ibid., xxiv, p. 365]; all except Dow 9B significantly controlled *P. splendens*.

P. Decker describes eggplant-breeding experiments for resistance to blight (*Phomopsis*) [*vexans*], during which 76 hybrid families [ibid., xxii, p. 194] were selected from the 1944 crops.

Observations on soil-treatment plots made by W. B. Tisdale and A. N. Brooks showed that turning under vegetation a short time before planting Lima and snap beans and cabbage increased the damage caused by *Rhizoctonia* [*Corticium solani*].

E. West isolated from several specimens of *Camellia japonica* suffering from die-back disease mostly *Diplodia* sp., sometimes mixed with *Phomopsis* sp., or occasionally the latter alone. Very few isolations of *Gloeosporium* sp. were encountered, although this pathogen has been reported as the major cause of die back in other parts of the United States [ibid., xxv, p. 561]. *D.* (?) *camelliae* was found fruiting on two specimens.

The same author records that pruning of oleander plants in the greenhouse to remove all traces of witches' broom and cankers produced by inoculation [? with *Sphaeropsis* sp.: ibid., xvii, p. 324] was followed by the emergence of new brooms on the old stems and one plant died with a canker.

W. B. Tisdale found that dusting with zerlate, fermate, or spergon considerably increased the yield of the Abbott and Cobb cucumber variety, suffering from downy mildew [*Pseudoperonospora cubensis*].

A species of *Pythium* isolated by W. B. Tisdale and G. D. Ruehle from diseased roots of Easter lilies [*Lilium longiflorum*] grown commercially in Dade County proved by cultural characters and cross-inoculations to be identical with the species causing root rot of Chinese evergreen (*Aglaonema simplex*: *Rep. Fla. agric. Exp. Sta., 1943*). Cultures from both hosts have been identified by J. T. Middleton as *P. splendens*. The pathogen appears to have a wide distribution in the State probably due to dissemination on bulbs and cuttings. The root systems of vigorous plants were almost completely destroyed in 21 days.

H. A. Eddins (pp. 108–111) reports that ring rot of potatoes (*Corynebacterium sepedonicum*) appeared only in fields where the tubers used came from areas where a zero tolerance of the disease was not required for certification. Reduction in yield of Katahdin potatoes caused by a 16 or more per cent. infection with leaf roll reflected the importance of planting tubers free from this disease. Complete resistance to leaf roll was shown by 17 seedling crosses from the Maine Agricultural Experiment Station [*R.A.M.*, xxv, p. 573] when grown in the Hastings area. Hybrid X 1276 × 278 had the most desirable qualities. A USDA seedling hybrid, B70–5, resistant to late blight (*Phytophthora infestans*), when grown at Hastings proved resistant to drought and heat and gave an excellent yield. The value of planting Sebago and Katahdin, varieties resistant to brown rot (*Bacterium* [*Xanthomonas*] *solanacearum*), was illustrated in the Hastings area where losses from this disease in a season favouring the pathogen were only 1 per cent. [ibid., xv, p. 781].

Good control of cucumber downy mildew was secured by A. L. Harrison and D. G. A. Kelbert (pp. 121–122) with copper compound A (2 lb. per 100 gals. water and later 4–100), fermate (3–100), and dithane-zinc sulphate-lime (2–1–0·5–100), giving 11 applications at 2- to 6-day intervals. Adjacent unsprayed plants were entirely defoliated before maturation. Varieties resistant to *Pseudoperonospora cubensis* are being developed from crosses between the resistant hybrids Puerto Rico No. 39 and China and commercial varieties.

H. I. Borders (p. 138) found that fermate-zinc sulphate-lime at 2–1–0·5–100 gave best control of papaw target leaf spot [*Mycosphaerella* sp.: ibid., xxiii, p. 492] without injuring the leaf.

According to G. D. Ruehle (p. 145) the use of dithane-zinc sulphate spray on about 95 per cent. of the potato acreage in Dade County prevented late blight from becoming epiphytotic, and controlled early blight [*Alternaria solani*] remarkably well, resulting in record yields.

H. I. Borders and G. D. Ruehle (p. 146) found that of 321 avocado fruits of the Taylor variety from plants sprayed with cuprocide-zinc sulphate-lime (1–1–0·5–100), 96·2 per cent. were free from *Cercospora* [*purpurea*: ibid., xx, p. 483].

Commercial control of stem-end rot [*D. citri* and *Diplodia natalensis*: ibid., xxvi, p. 52] of oranges in the packing-house was obtained by C. R. Stearns (p. 158) using overripe Valencias and ripe Hamlin and Parson Brown fruits treated with 0·75 per cent. dowicide 2, dissolved in an organic solvent-water mixture, and not exposed to ethylene gas.

Intensive investigations of spreading decline of citrus [ibid., xxiii, p. 482] are

described by R. F. Suit (pp. 169–170). It spreads gradually at the rate of one to three trees a year in all directions, irrespective of slope of land or prevailing winds, round the trees first attacked. Progressive weakness accompanies defoliation and cessation of growth and no marketable fruit is borne. The disease is most conspicuous on grapefruit, but oranges and tangerines are seriously affected. No deaths from this disease have yet been reported. Roots of diseased trees showed a 25 to 50 per cent. reduction in the flow of water through them, but there were no abnormalities in the tissues and detached roots showed no tendency to decay. Iodine tests for the presence of starch are considered to be an unreliable criterion in diagnosis of the condition. Various isolates (mostly *Fusarium* spp.) are being tested for pathogenicity.

In thiourea treatment tests [ibid., xxiv, p. 147], undertaken by E. F. Hopkins and K. W. Loucks (pp. 171–175), with Hamlin, Pineapple, and Valencia oranges, 5 per cent. solutions gave virtually complete control of stem-end rot and almost eradicated mould [*Penicillium digitatum* and *P. italicum*]. A process has been developed whereby 5 per cent. thiourea is applied directly in the packing-house process and rinsed off before waxing and polishing the fruit, thus ensuring considerable protection from stem-end rot and mould for at least three weeks after harvesting. Painting the buttons of the fruit with relatively high concentrations of various chemicals and comparing stem-end rot incidence with controls in store showed that merthiolate (1 in 1,000), 10 per cent. 8-hydroxyquinoline sulphate, and 10 per cent. thiourea all gave excellent control. A three-minute dip in 2 to 10 per cent. 8-hydroxyquinoline sulphate resulted in 0 per cent. infection by *Diaporthe citri* in Valencia oranges so treated and either not rinsed or rinsed with 1 per cent. sodium bicarbonate, and in 2 per cent. infection when dipped and rinsed in tap-water, compared with 30 per cent. in undipped.

In experiments with potatoes conducted by G. R. Townsend (p. 210) ethylene chlorhydrine treatment resulted in earlier growth responses, higher stands, yields, and scab [*Actinomyces scabies*] counts than ammonium thiocyanate treatment; both reduced seed-piece decay by effectively breaking dormancy. Late September plantings yielded more potatoes than mid-September or early October plantings, but scab counts were lowest in the later plantings. A significant positive correlation was observed between temperatures during the tuberization period and the percentage incidence of common scab. The lower scab counts with ammonium thiocyanate are explained by the later tuberization at which time conditions are less favourable for *A. scabies*.

G. R. Townsend and E. L. Felix (pp. 212–214) found that the most destructive virus diseases of celery during the year were southern celery mosaic [caused by a strain of cucumber mosaic virus: ibid., xv, p. 195], a second provisionally designated oak-leaf, and a third very similar to western celery mosaic [celery mosaic virus: ibid., xviii, p. 369]. Symptomatic and cross-inoculation studies showed that purslane (*Portulaca oleracea*) is a host for the second and third viruses, and that the oak-leaf condition, regarded by Wellman [ibid., xiv, p. 615] as a manifestation of southern celery mosaic, is a distinct disease. Oak-leaf symptoms are very like those of celery calico [ibid., xxv, p. 396], but the pattern is simple rather than intricate, and there are host differences. Pseudo-calico has not been fully described [ibid., xix, p. 60].

Reporting on the control of tobacco downy mildew [*Peronospora tabacina*: ibid., xxv, p. 237], R. R. Kincaid (p. 221) records that the only failure of fermate to give good commercial control of the disease was in a bed where it appeared late in February, and emphasizes the importance of summarily destroying old beds and of planting only new or steamed beds to reduce the danger of early infection. A 10 per cent. fermate dust plus 1 per cent. zinc sulphate gave control equivalent to the standard 20 per cent. fermate. Cool weather following the early trans-

plantings caused much mildew damage to lower leaves of cigar-wrapper tobacco. Later transplanted crops suffered little.

Castellani (E.). **Stato delle conoscenze micologiche e fitopatologiche per l'Eritrea, la Somalia e l'Etiopia.** [The state of mycological and phytopathological knowledge in Eritrea, Italian Somaliland, and Abyssinia.]—Reprinted from *Riv. Agric. subtrop. trop., 1945*, 1–12, 17 pp., [? 1946].

As circumstances have not yet made it possible to publish the first supplement to the list of plant diseases observed in 'Italian East Africa' [*R.A.M.*, xvii, p. 346], the writer has prepared this succinct review of the numbers and distribution of the fungal plant diseases and other fungi in these regions. There are now records of 897 species of fungi (including Myxomycetes), representing 303 genera [families only named with their distribution in six main areas], while the 76 host families [also listed] include 351 species in 234 genera. The work done by mycologists in each of the three countries is briefly indicated, and there is a bibliography of papers not listed in the earlier work [loc. cit.] or published since.

Braun (A. C.) & Elrod (R. P.). **Stages in the life history of Phytomonas tumefaciens.**—*J. Bact.*, lii, 6, pp. 695–702, 8 figs., 1946.

The stages in the life-history of the agent of crown gall (*Phytomonas* [*Bacterium*] *tumefaciens*) were studied on Stapp and Bortels's special carrot media [*R.A.M.*, xi, p. 357] under the electron microscope, using the highly motile *Chry*[*santhemum frutescens*] II B strain. At the centres of a few of the star-shaped aggregates constituting one of the phases in the morphology of the organism [ibid., xxi, p. 444] was a chromatinic substance apparently representing a fusion of the Feulgen-positive material. This finding is highly suggestive of a simple form of sexuality in *Bact. tumefaciens*, but the authors feel that cytological studies alone are inadequate to afford a definite solution of the problem.

Draghetti (A.). **Natura genetico — morfologica — ambientale della resistenza del Frumento alle Puccinie sp.** [The genetic, morphological, and environmental nature of the resistance of Wheat to species of *Puccinia*.]—*Genet. agrar.*, i, 1, pp. 103–111, 1946. [Latin and English summaries.]

The author's observations on varietal resistance in wheat to rusts (*Puccinia* spp.) in relation to environmental and internal factors [*R.A.M.*, x, 367] confirm his previous finding that in the hot, dry parts of Italy all varieties show grade-1 resistance, whereas in cold, dry areas awned varieties show grade-1 resistance and awnless varieties grade-2. In cold, wet localities the loose-awned varieties are slightly susceptible and the compact-awned rather more so, while the loose awnless wheats are moderately, and the compact awnless definitely, susceptible. Under hot, wet conditions all varieties are more or less susceptible, though the awned varieties are less affected than the awnless, which are completely susceptible, particularly the compact-awnless.

The evidence indicated that under the conditions prevailing in northern Italy the lack of pigment in the epidermis of the leaves plays some part in the physiological resistance of certain wheat varieties, experiments having established that there was a direct correlation between the pigmentation of the tissue and transpiration and photosynthesis. In 1924, therefore, the author, in breeding experiments, tried to develop varieties with a completely colourless epidermis. The best Italian wheats, Rieti and Cologna, were used, and a variety of [*Triticum*] *albidum* obtained from the Far East. From one cross with Rieti he obtained two types of *T. albidum*, one awnless and one awned. When these were grown on a large scale, both showed an almost constant immunity from rusts, even in years when

Mentana and Villa Glori were heavily infected. Even in normal years these two *albidum* wheats were conspicuous for the small amount of dust they gave during threshing and their freedom from any fungal attack. In particular, they showed high resistance to *P. glumarum*. Observations on these two wheats from 1932 to 1945 lead the author to conclude that their resistance to rusts is largely due to the transparency of their green tissues, owing to the absence of other pigments. This allows solar radiation to pass more deeply into the mesophyll and to retard by actinic action the development of the mycelium. Both varieties, named, respectively, 'Mutina precoce aristato' and 'Mutina precoce mutico', are now being widely grown.

Volosky Yadlin (Dora). **Nuevas razas fisiológicas de Puccinia triticina para Chile.** [New physiologic races of *Puccinia triticina* for Chile.]—*Agric. tec., Chile*, vi, 1, p. 67, 1946.

In addition to the five physiologic races of *Puccinia triticina* already recorded for Chile, viz., 15, 68, 71, 85, and 114 [*R.A.M.*, xxv, p. 158], two others have been observed, both on Klein Granadero wheat from Ovalle, namely, 66 in November, 1944, and 55 in September, 1945.

Yersin (H.), Chomette (A.), Baumann (G.), & Lhoste (J.). **L'hexachlorobenzène produit organique de synthése utilisé dans la lutte contre la carie du Blé.** [Hexachlorobenzene, a synthetic organic product utilized in the control of Wheat bunt.]—Reprinted from *C.R. Acad. Agric. Fr., 1945*, 17th January, 3 pp., 1945.

Encouraging results having been secured in a preliminary test in 1942–3 in the control of wheat bunt [*Tilletia caries* and *T. foetida*] by seed-grain treatment with hexachlorobenzene, large-scale trials were conducted in two localities near Paris in 1943–4, using Arnaud and Gaudineau's methods of inoculation and calculation of the experimental data [*R.A.M.*, ix, p. 637].

At Argenteuil immersion of the seed for 20 minutes in solutions of hexachlorobenzene at concentrations of 0·02, 0·06, and 0·2 per cent. on 11th November resulted in the total elimination of infection, as also did the same treatment with 2 per cent. Bordeaux mixture, the incidence of bunt in control plants from untreated seed being 26·2 per cent. At Versailles the only treatment giving complete control was the 0·2 per cent. hexachlorobenzene, the amounts of infection in plants from seed treated with 0·06 and 0·02 per cent. being 1·8 and 2·3 per cent., respectively, and in those treated with Bordeaux mixture and the controls 0·4 and 23·4 per cent., respectively. Sprinkling with hexachlorobenzene at the rate of 100 gm. in 15 l. water per 100 kg. seed was completely efficacious in two out of three plots, the third showing a trace (0·2 per cent.) of bunt as compared with 11·8 per cent. in the untreated controls. The same treatment with 0·25 per cent. formalin was also successful. At Argenteuil dusting with hexachlorobenzene at a dosage of 200 gm. per 100 kg. seed gave complete control where the proportion of the active principle was 75 or 25 per cent., the 100 and 50 per cent. contents permitting traces of infection (0·4 and 0·15 per cent., respectively), while the amounts of bunt in the control plot and one treated with an organic mercury product were 26·2 and 0·15 per cent., respectively. At Versailles the incidence of infection in plants from similarly treated seed (100, 50, and 25 per cent. of the active ingredient) was 0·1, 0, and 0 per cent., respectively, control 23·4 per cent., and a copper oxychloride dust 0·1 per cent.

On the basis of these results hexachlorobenzene is considered to be a promising agricultural substitute for copper, and more especially for the poisonous organomercuric compounds with their grave risks to health.

Compton (L. E.) & Caldwell (R. M.). **Yield reductions by loose smut of Wheat.**—*Phytopathology*, xxxvi, 12, pp. 1040–1042, 1946.

The relation of the percentage of infection by wheat loose smut (*Ustilago tritici*) to yield reductions in the highly susceptible soft red varieties Purdue No. 1 and Wabash was investigated in 1941 and 1942 at the Indiana Agricultural Experiment Station. In both years a close correlation was established between the incidence of the disease, as measured by the percentage of infected heads, and the resultant losses, which amounted in Purdue No. 1 to 7·3 and 7·4 per cent., respectively, in 1941, and to 35·9 and 38·2, respectively, in 1942, the corresponding figures for Wabash being 13·2 and 13·4 per cent., respectively, in 1941, and 8·4 and 7·9, respectively, in 1942. No appreciable degree of infection by any other seed-borne disease was observed in the trial plots in either season, so the possibility of confusion in the interpretation of the data is considered to be remote. The authors' results are in agreement with those of H. M. Brown (*J. Amer. Soc. Agron.*, xxxvi, pp. 779–782, 1944) and with the conclusions drawn by Semeniuk and Ross from a comparable study on barley loose smut [*U. nuda*] in Canada [*R.A.M.*, xxii, p. 61].

Sarasola (J. A.), Favret (E. A.), & Vallega (J.). **Reacción de algunas Cebadas con respecto a 'Erysiphe graminis hordei' en Argentina.** [Reaction of some Barley varieties in regard to *Erysiphe graminis hordei* in Argentina.]—*Rev. argent. Agron.*, xiii, 4, pp. 256–276, 1946. [English summary.]

Erysiphe graminis is stated to be one of the most destructive pathogens on barley in Argentina, where information as to physiologic specialization within the fungus species [*R.A.M.*, xxv, pp. 31, 444] was lacking until the authors tested a large assortment of differential varieties with collections of the pathogen from various parts of the grain area. The results indicated that the country harbours only a single race, Arg. 1, differing from all others previously described. However, in a footnote added while this paper was in the press, the detection of a second physiologic race is reported. Among the more interesting responses of the varieties inoculated with Arg. 1 are the immunity of Monte Cristo C.I. 1017, West China, and Engledow India, the high resistance of Multaux Glabron 4884, Cebada Negra, Anoidium, and (slightly less) of Nigrate C.I. 2444, Lion × Palmella Blue 3877, and Gopal C.I. 1091; the resistance of Arlington Awnless C.I. 702 and Palmella Blue C.I. 3609; and the moderate resistance of *Hordeum distichum nigrinudum*, H. 541 (*H. polystichum nudum*), from Japan, and Importada Brugger (04)35.

Suneson (C. A.). **Effect of Barley stripe, Helminthosporium gramineum Rab., on yield.**—*J. Amer. Soc. Agron.*, xxxviii, 11, pp. 954–955, 1946.

Surveys conducted in California over the three-year period from 1943 to 1945 showed seed treatment and the cultivation of resistant varieties to be fairly effective in barley stripe (*Helminthosporium gramineum*) control [*R.A.M.*, xxii, p. 473], only one field in 25 showing more than 10 per cent. infection, though 20 per cent. harboured a trace or upwards. In paired tests in 1944 and 1945 with disease-free and stripe-inoculated seed of hybrids between a susceptible male-sterile strain (used as the female parent) and six genetically diverse pollen parents, viz., Vaughn, Trebi, Atlas, Rojo, Winter Tennessee, and Club Mariout, the aggregate yield reduction from the disease was apparently of the general order of 0·75 per cent. for each 1 per cent. infection. The mean values of the stripe-diseased plants, acre yield (in bushels), and percentage yield reduction from the fungus in the uninoculated and inoculated plots were 0 and 29, 106·3 and 81·3, and 0 and 22, respectively.

Apart from the practical application of these data to the estimation of stripe losses, they are of interest as suggesting that barley can make a 25 per cent. recovery in yield for deficient stand between heading and maturity.

Houston (B. R.) & Oswald (J. W.). **The effect of light and temperature on conidium production by Helminthosporium gramineum in culture.**—*Phytopathology*, xxxvi, 12, pp. 1049–1055, 1 fig., 1946.

At Davis, California, abundant normal sporulation of *Helminthosporium gramineum*, the agent of barley stripe, was obtained on potato dextrose agar cultures left outdoors for exposure to diurnal environmental changes. Under these conditions the conidia were produced on monoconidial isolations, mass mycelial transfers, and mycelial growth developing from fragments of diseased leaves placed on agar [*R.A.M.*, ii, p. 61]. Sporulation did not occur in the dark, either outdoors or in the laboratory, or under continuous high indoor temperatures in the light. A few conidia were produced under artificial light.

Relatively high temperatures and protracted exposure to light throughout the growing period resulted in excessively long conidiophores and sparse conidial production, both in culture and on pieces of diseased leaf. When the latter were incubated on agar in the dark at various points from 8° to 35° C., conidiophore length increased and that of the conidia decreased with rising temperatures. Thus, at 8° the length of the conidia ranged from 82·6 to 129 μ and at 18° from 62·4 to 96·8 μ, the corresponding average numbers of septa being 5·7 and 4·4 respectively.

Wager (V. A.). **Preliminary investigations on the black spot disease of Citrus.**—*Fmg S. Afr.*, xxi, 248, pp. 770–772, 2 figs., 1946.

In spite of exceptionally dry spring weather in 1945 and 1946 citrus black spot (*Phoma citricarpa*) [*R.A.M.*, xxiii, p. 175; xxiv, p. 128] continued to cause serious damage in many parts of South Africa. It was previously thought that the disease was confined to the mist-belt areas, but it is now considered likely that even in dry areas or dry seasons slight rains may be frequent enough to allow infection of the young fruit. The condition has now been found on oranges, lemons, grapefruit, and naartjies [mandarins] in numerous localities in Natal, Zululand, and the Transvaal. Experimental evidence showed that it can be prevented by spraying with commercial Bordeaux mixture (4–4–50) at petal-drop, with two further applications at intervals of six weeks. This treatment, however, is not recommended, owing to its deleterious effect on the leaves and fruit. Further work is in progress.

Ray (W. W.). **Cotton boll rots in Oklahoma.**—*Bull. Okla. agric. Exp. Sta.* B—300, 26 pp., 7 pl., 1 map, 1946.

While several fungi are associated with cotton boll rot and lint deterioration [*R.A.M.*, xxii, p. 479] in Oklahoma (a three-year survey in 34 counties showing *Alternaria* spp., *Aspergillus niger*, *Curvularia* spp., *Fusarium moniliforme* [*Gibberella fujikuroi*], *F.* spp., *Glomerella gossypii*, *Penicillium* spp., *Rhizopus nigricans* [*R. stolonifer*], and other fungi (including *Macrophomina phaseoli*) to be present, respectively, in 100, 28·6, 11·4, 52·9, 64·3, 5·7, 10, 14·3, and 18·6 per cent. of 70 samples), pathogenicity tests conclusively demonstrated them to be secondary invaders following boll injury due mainly to insect puncture or to bacterial blight (*Xanthomonas malvacearum*) [ibid., xxii, p. 386]. Blight lesions play an important part as the first step in the rot, since it is largely by means of them that the secondary fungi are enabled to enter the boll tissues. The bacterium is not important as a direct cause of the rot, as the lesions caused by it develop slowly, remain shallow, and often do not penetrate into the lint cavity.

As a result of inoculation experiments with the aforementioned fungi it was found that *R. stolonifer* and *A. niger* [ibid., vii, p. 96], separately, caused the most complete and rapid boll rot. *Gibberella fujikuroi* was only slightly less active. All, except *R. stolonifer* and *Glomerella gossypii*, produced more rapid deterioration

of the internal boll tissues than of the external. All the *Alternaria* spp. isolated were of the *A. tenuis* group, which is regarded as the most important cause of boll rot in Oklahoma. During the dry summer of 1943 *X. malvacearum* failed to develop, and boll-rotting was infrequent, but in the wetter seasons of 1942 and 1944 the bacterium was abundant, as were, subsequently, the boll-rotting fungi.

The key to the control of boll rots lies in the control of *X. malvacearum* [ibid., xxii, p. 386]. In 1944, in field tests with acid-delinted seed of the Deltapine 14 and Stoneville 2B varieties inoculated with a bacterial suspension, that treated with new improved ceresan showed no seedling infection as against 19·25 and 14·75 per cent., respectively, in the untreated. In 1945 greenhouse tests fuzzy Hi-Bred seed inoculated in the same way showed 0 to 1·4 per cent. seedling infection after treatment with new improved ceresan compared with 14·5 to 18·2 in the untreated. Work on the production of blight-resistant varieties has begun.

Marchionatto (J. B.). **Un nuevo Cordyceps (Ascomicetos) sobre 'Araña Pollito'.** [A new *Cordyceps* (Ascomycetes) on the 'Chicken Spider'.]—*Physis, B. Aires*, xx, 55, pp. 16–18, 2 figs., 1945.

In October, 1944, the author received from the Department of Agricultural Zoology, Ministry of Agriculture, Buenos Aires, a specimen of the 'chicken spider' (Theraphosidae, Arachnidae) parasitized by a hitherto unknown fungus to which the name of *Cordyceps ignota* n.sp. is assigned. Its fructifications consist of a semi-erect, branched, glabrous, yellowish-white to purple stipe, 2 to 3 cm. in height; a clavate, curvulate, pruinose cap, 1 to 2 cm. in diameter; oval perithecia, 110 to 130 by 55 to 65 μ, provided with minute ostioles, immersed in the caespitose stromata developing on the ultimate segments of the legs; cylindrical, capitate, flexuous, hyaline asci, 72 to 82 by 5·5 to 6·5 μ, and linear, hyaline ascospores, 59 to 61 by 2 μ. The legs of the spider are inseparably united by the branches of the stipe.

Lepesme (P.). **Quelques mots sur les Laboulbéniales.** [Some remarks on the Laboulbeniales.]—*Entomologiste*, ii, 3, pp. 81–90, 10 figs., 1946.

The author briefly discusses the taxonomy and describes the morphology of the Laboulbeniales [cf. next abstract], with special reference to the species parasitic on Coleoptera in France.

Arwidsson (T.). **Om svenska Laboulbeniacéfynd.** [On Swedish finds of Laboulbeniaceae.]—*Svensk bot. Tidskr.*, xl, 3, pp. 307–309, 1 fig., 1946. [English summary.]

In collaboration with Dr. C. Lindroth the author obtained material of Laboulbeniaceae [see preceding abstract] from five Swedish provinces. Only two species, both of the genus *Laboulbenia*, have so far been closely investigated, namely, one on the beetle *Bradycellus collaris* from East Gothland and the other on *Harpalus melleti* from Gothland. The latter fungus did not infect all the species of *Harpalus* on which it was tested, but only those of the same subgenus (*Ophonus*). Soil contaminated by the spores was more effective in the spread and development of the pathogen than direct contact with infested insects.

Walker (E. A.), Jehle (R. A.), & Jenkins (Anna E.). **Violet scab widely distributed in Maryland.**—*Plant Dis. Reptr*, xxx, 12, pp. 471–474, 1 map, 1946. [Mimeographed.]

Records recently obtained by the authors show that violet scab (*Sphaceloma violae*) [*R.A.M.*, xxiv, p. 192 and next abstract] is widely distributed on wild violets in Maryland. An intensive survey in Frederick County in 1945 showed the

disease to be very common, though violets growing at an altitude of over 1,000 ft. appeared unaffected, except in the Catoctin Mountain area near Foxville. At Lanham garden-grown *Viola striata* plants were affected.

When all the affected leaves were removed from sweet violets [*V. odorata*] in a heated frame in Rosaryville, the plants bloomed well during the winter, but lesions were found again in April on the blades and petioles of old yellowed leaves remaining on the plants; violets with the same history but in an open frame near by were entirely healthy, as were wild violets growing on the premises. On 12th July the disease was found in a greenhouse on the same site on white sweet violet plants obtained locally. Plants from the open cold frame had been transplanted near by and the disease was spreading to them from the white violets which were eventually almost destroyed by scab, though further spread on the blue violets was arrested by spraying.

JENKINS (ANNA E.). **Scab in a Violet collection in Virginia and some new records in other States.**—*Plant Dis. Reptr*, xxx, 12, pp. 475–476, 1946. [Mimeographed.]

Violets of at least 27 species and one variety [which are named] growing at Falls Church, Fairfax County, Virginia, were found in July, 1946, to be affected by scab (*Sphaceloma violae*) [see preceding abstract]. As all but two of the 24 North American species present were attacked, it would seem that these species growing wild in the Atlantic basin north of latitude 37° are liable to become affected. A search revealed affected wild violets along the Shenandoah River, West Virginia, and on the Skyline Drive, Virginia. In Delaware, a few infected plants were found growing as weeds at Bridgeville, Sussex County, apparently a first record for the State. By 1944 the disease had been recorded in all the coastal States from Massachusetts to Texas, except Delaware, and in 1945 it was found in Illinois. Repeated applications of Bordeaux mixture (4–2–50) gave satisfactory results at Falls Church.

WARE (ROMAINE B.). **Controlling blight of Lilies.**—*Horticulture*, xxiv, 11, p. 317, 1946.

In Oregon, where lilies are grown on a commercial scale, very satisfactory control of the destructive blight caused by *Botrytis* [*elliptica*: *R.A.M.*, xxv, p. 215] has been obtained by spraying with a mixture consisting of 1 lb. micronized copper, 4 oz. No. 101 Bordeaux spreader, and (for hard water) 1 oz. wetaline per 25 gals. water. Treatments should be given during the rainy period from April to June whenever temperatures approach 60° C., the optimum for infection.

ROSEN (H. R.). **Fungicides and insecticides used on garden Roses.**—*Amer. Rose Annu., 1946*, pp. 168–174, 1946.

Five tables are given, showing (i) in alphabetical order the trade names, active ingredients, and purposes of fungicides used to control parasitic diseases and insect pests on roses; (ii) standard or common fungicides used to control black spot [*Diplocarpon rosae*], powdery mildew [*Sphaerotheca pannosa*], and other diseases; (iii) standard or common insecticides; (iv) insoluble or 'fixed' coppers for the control of the above-mentioned diseases; and (v) new organic fungicides and insecticides and their chemical composition.

VIENNOT-BOURGIN (G.). **À propos d'un Oidium des feuilles de Lilas.** [On an *Oidium* affecting Lilac leaves.]—*Rev. Mycologie*, N.S., ix, 4–6, pp. 75–77, 1944. [Received October, 1946.]

For some years past lilac growing in clumps near Paris has been affected by a mildew. Infection begins in September, is very active during the first half of

October, and persists until the leaves fall. Those facing north and in the shade are most affected. The fungus at first develops on the upper surface of the blade as diffuse, arachnoid, isolated, or confluent white spots which gradually become greyish. On the lower surface they are less numerous and less easily visible.

Usually only the conidial stage was present, the erect conidiophores bearing one, or occasionally two, terminal conidia. In October, 1945, material bore pale-yellow, orange, or dark brown perithecia in different stages of maturity on the lower leaf surfaces only. The spherical perithecia measured 150 to 300 μ in diameter, and had a wall 15 to 20 μ thick. On the surface of conceptacles were 5 to 18 hyaline, rigid, acuminate appendages, swollen at the base. The fungus clearly answered to the description of *Phyllactinia corylea* [*R.A.M.*, xiii, p. 127; xix, pp. 309, 330]. Mature asci were not observed.

KUHNHOLTZ-LORDAT (M.). **Notes de pathologie végétale.** [Plant pathological notes.]—*Ann. Épiphyt*, N.S., xii, 1, pp. 41–43, 1 fig., 1946.

In this further series of plant pathological notes [cf. *R.A.M.*, xxv, p. 381] the author states that in the vicinity of Montpellier leaf spot infection of *Photinia serrulata* is of the type of [*Phyllosticta*] *photinicola*. The pycnidia range from 128 to 140 μ in diameter and the ovoid conidia measure 5 to 6 by 3·5 μ. The spots are greyish-white, with a narrow purple border, and may have an area of 1 sq. cm.

POHJAKALLIO (O.). **Untersuchungen über den Kleekrebs und seinen Anteil am Verschwinden des Klees in Kleegrasgemischen.** [Studies on Clover rot and its share in the disappearance of the Clover in Clover-grass mixtures.]—*Pflanzenbau*, xvi, 4, pp. 136–160; 5, pp. 201–205, 9 figs., 1 diag., 1939. [Received January, 1947.]

Sclerotinia trifoliorum constitutes the chief threat to clover cultivation in Finland [*R.A.M.*, xxvi, p. 10], where it often partially or wholly decimates the crop in some localities. In most of the years covered by the writer's investigations (1933 to 1938) alsike clover (*Trifolium hybridum*) was more susceptible than red (*T. pratense*), while the best native strains of the latter were more resistant than those of foreign origin, though not sufficiently so to avert losses of more than half the crop in seasons of severe epidemics. In pot inoculation experiments on various clover strains with pure cultures of the fungus no differences in reaction were perceptible, all being almost totally destroyed.

Several isolates of *S. trifoliorum* differed in their morphological and biological characters. For instance, a strain isolated from red clover (one from white clover resembled it closely) at Jokioinen, where the disease occurs in an extremely acute form, was strongly pathogenic to the various clovers, lucerne, *Lotus corniculatus*, *Myosotis arvensis*, *Thlaspi arvense*, *Chenopodium album*, and *Cirsium arvense*. Sclerotia was formed along the edge of the Petri dish on Henneberg agar.

The pathogenicity of strain 'Tammisto A', isolated from red clover leaves from the Tammisto Plant Breeding Institute, was comparatively mild. Like the foregoing, it formed sclerotia predominantly at the periphery of the culture; the growth rate of its very sparse mycelium was slower than that of the other isolates. A strain procured from Leipzig, Germany, approximated to 'Tammisto A' in pathogenicity to red clover and *L. corniculatus*. On Henneberg agar the sclerotia were almost uniformly distributed over the surface. A strain from *T. arvense* was feebly pathogenic to its own host and red clover. On sterilized potato it formed a dense mycelium and a considerable number of generally rather small and much-flattened sclerotia. A mixture of the Jokioinen, 'Tammisto A', and Leipzig isolates, grown on tomato fruits, was strongly pathogenic to the variou sclovers.

The fact that *S. trifoliorum* is strongly aerobic is believed to account for the observed variations in the extent of the damage in the open. Thus, in one meadow

covering several hectares, only about 1 per cent. of the red clover at the bottom of several water-furrows had been killed, compared with 90 to 99 per cent. for the rest of the field.

Differences in manurial practice or inoculation with nodule bacteria were without effect on the damage caused by clover rot, resistance to which in the new growth was weakened by mowing the stubble right down to the ground in September.

In addition to *S. trifoliorum*, two other strains of uncertain identity were studied in the laboratory. One, isolated from wax bean (*Phaseolus*) [*vulgaris*], formed abundant mycelium but few sclerotia on Henneberg agar; it was highly pathogenic to *T. arvense*, *Chenopodium album*, *Trifolium medium*, *M. arvensis* (completely destroyed), fairly so to red clover, and caused 20 to 38 per cent. infection on *L. corniculatus*. The other, designated 'Tammisto B', was isolated from the sixth subculture of 'Tammisto A', from which it differed in the size, shape, and slow growth of its sclerotia, and in its abundant mycelial development. In pathogenicity to the test plants it resembled the parent strain. The sclerotia of 'Tammisto B' approximate closely to those of *S. minor* as described by Chivers [ibid., viii, p. 607], in which connexion it is recalled that Valleau *et al.* regard *S. minor* as identical with *S. trifoliorum* [ibid., xiii, p. 241].

Jones (F. R.) & Torrie (J. H.). **Systemic infection of downy mildew in Soybean and Alfalfa.**—*Phytopathology*, xxxvi, 12, pp. 1057–1059, 1 fig., 1946.

Downy mildew (*Peronospora manshurica*) developed about mid-June, 1945, at the Wisconsin Agricultural Experiment Station, and before the end of the summer the entire soy-bean nursery was involved. In the more susceptible varieties, e.g., Richland and Illini, many pods bore seed encrusted with the oospores of the fungus, as described by Johnson and Lefebvre [*R.A.M.*, xxi, p. 361]. Planted in the greenhouse, such seed at times gave rise to seedlings with lesions apparently connected by mycelium in a systemic infection, and similar material was collected in the field by W. B. Allington and others. The development of spore encrustations on the seed was correlated with the size of the foliar lesions, the former being conspicuously in evidence where the latter were large, and occasional or virtually absent in plants with small spots or none. Seed yield did not appear to be reduced by the disease.

Nursery lucerne also suffered from downy mildew (*P. trifoliorum*) [ibid., xxi, p. 22; xxiv, p. 62] in the same season, the percentage of infection ranging from 12 per cent. in Hardistan and Ladak to 60 per cent. in Hardigan. Individual plants and clones varied in their reaction to the fungus, which was usually confined to the leaves, though occasionally systemic. Conidia produced in April, 1946, on overwintered crown shoots of systemically infected plants are believed to have been the source of a severe outbreak of the disease in May. In selfed populations over half the progeny of susceptible parents were similarly diseased, with a few cases of systemic infection.

Stevenson (J. A.). **Powdery mildew of Mesquite.**—*Plant Dis. Reptr*, xxix, 8, pp. 214–215, 1945. [Mimeographed. Received January, 1947.]

Mesquite (*Prosopis chilensis*) growing in Texas and the adjoining part of Mexico is commonly affected by powdery mildew, caused by *Leveillula taurica* [*R.A.M.*, xviii, p. 83; xxiv, p. 343].

Katznelson (H.). **The 'rhizosphere effect' of Mangels on certain groups of soil microorganisms.**—*Soil Sci.*, lxii, 5, pp. 343–354, 6 graphs, 1946.

At the Department of Agriculture, Ottawa, Canada, mangel roots were found to exert a marked selective action on various groups of micro-organisms in both

manured and unfertilized soils [cf. *R.A.M.*, xxii, p. 497]. Thus, in the former the rhizosphere: control soil ratios of *Actinomyces* spp. and fungi after 80, 117, and 142 days' growth were 3, 23, and 30, and 2·5, 6, and 3, respectively, the corresponding figures for the latter being 2, 23, and 6, and 2·5, 19, and 5, respectively.

Fischer (A.). **Über einige Krankheiten an Obstbäumen.** [On some fruit tree diseases.]—*Schweiz. Z. Obst- u. Weinb.*, lv, 26, pp. 495–502, 4 figs., 1946.

Notes are given on some diseases of fruit trees which assumed unusual prominence in Switzerland during 1946. Isolations from rotted apple buds yielded various organisms, including *Fusarium lateritium* [*R.A.M.*, xvi, p. 18; cf. also ibid., xxi, p. 3]. Apple mildew (*Podosphaera leucotricha*), favoured by the dry spring, caused heavy damage in some localities, and its control presents great difficulties. The application of sulphur sprays to the buds containing the overwintering mycelium has not proved effective, and the excision and burning of infected branches is impracticable, especially on large trees. Landsberger Reinette is the most susceptible variety; immunity from the disease is unknown.

Phytophthora omnivora [*P. cactorum*] induced a purple-brown discoloration of pear fruits [ibid., xv, p. 555; xxi, p. 531], on the surface of which the white mycelium developed under persistently humid conditions. The pathogen overwinters in the soil and hence primarily affects the fruits on the lower branches. Post-blossom sprays are the most important in the prophylaxis of the rot. Diseased fruits should be collected and destroyed.

Cylindrosporium padi [ibid., iii, p. 724] is reported to have been prevalent on nursery cherry trees, inducing the formation on the leaves of dark red-brown, diffuse, often coalescent, persistent lesions and premature defoliation.

Spraying experiments in the canton of Ticino showed that peach shot-hole (*Clasterosporium carpophilum*) and scab (*Venturia cerasi*) [ibid., vii, p. 557] may be effectively combated by summer treatments with the organic fungicides, grisard, organol, and pomarsol [ibid., xxii, p. 314 *et passim*], which are innocuous to the very sensitive foliage. Preventive pre-blossom 'reserve' sprays of Bordeaux mixture or copper oxychloride should also be given [cf. next abstract].

Blumer (S.), Bieri (F.), & Lüthi (E.). **Die kombinierte Spritzung beim Kernobst.** [The combined spraying of pome fruits.]—*Schweiz. Z. Obst- u. Weinb.*, lv, 26, pp. 503–506, 1946.

A tabulated account is given of experiments in three localities of Switzerland in 1946 to determine the value against apple scab [*Venturia inaequalis*] and insect pests of a combined spray of Bordeaux mixture or copper oxychloride [*R.A.M.*, xxii, p. 314] with emulsified fruit tree carbolineum or dinitrocresol given from 23rd to 29th March. On the Bohn variety the average percentage of infection on trees sprayed with (1) 4 per cent. Bordeaux was 6·5, (2) 2 per cent. copper oxychloride, 16·6, (3) 4 per cent. Bordeaux plus 6 per cent. carbolineum, 5·9, (4) 2 per cent. copper oxychloride plus 6 per cent. carbolineum, 14·1, (5) 4 per cent. Bordeaux plus 2 per cent. dinitrocresol, 10·6, and (6) 2 per cent. copper oxychloride plus 2 per cent. dinitrocresol, 18, compared with 35·2 on the controls. The average incidence of scab on five varieties (Bohn, Boskoop, Boiken, Sauergrauech, and Golden Pearmain) sprayed with (1) Bordeaux alone was 6·9 per cent., (2) the same plus carbolineum, 7·7, (3) the same plus dinitrocresol, 11·2, (4) copper oxychloride alone, 14·9, the same plus carbolineum, 15·7, the same plus dinitrocresol, 15, and untreated 36·8.

Further trials are necessary to elucidate various points connected with the relative merits of the two fungicides in combined treatments, but the definite and persistent protection conferred by the combined spray emerges clearly from these preliminary tests.

Saccas (A.). **Étude morphologique et biologique des Fusicladium des Rosacées.** [A morphological and biological study of the species of *Fusicladium* affecting the Rosaceae.]—317 pp., 2 pl., 59 figs., 5 graphs, Paris, Librairie Le François, 1944 (published 1945). [Received September, 1946.]

The results are fully described of a comparative study of the morphology, histology, and biology of the mycelium, conidiophores, and conidia, both on the host and in culture, of *Fusicladium dendriticum* (*Venturia inaequalis*), *F. pirinum* (*V. pirina*) and *F.* [*pirinum* var.] *pyracanthae* [*R.A.M.*, xxiii, p. 346] on apple, pear, and *Crataegus pyracantha* [*Pyracantha coccinea*], respectively.

The development and release of the conidia under various conditions were studied both on the host and in culture. The conidial measurements of *V. pirina* on the host leaves, branches, and fruit were, respectively, 22·5 by 7·25, 25·3 by 7·7, and 24·3 by 7·25 μ, the corresponding figures for *V. inaequalis* being 20·76 by 7·63, 21·98 by 8·01, and 21·64 by 8·4 μ, and for *F. pirinum* var. *pyracanthae* 16·64 by 8·29, 17·97 by 8, and 17·52 by 8·51 μ.

The conidia of *V. pirina* were usually unicellular, only 3 to 20 per cent. being bicellular; of *F. pirinum* var. *pyracanthae* 10 to 25 per cent. and of *V. inaequalis* 14 to 60 per cent. were bicellular.

At a constant humidity the minimum, optimum, and maximum temperatures for conidial germination were, respectively, 1°, 20°, and 33° C. for *V. pirina*, 1°, 18°, and 32° for *V. inaequalis*, and 2°, 22°, and 35° for *F. pirinum* var. *pyracanthae*. At 40° the conidia of all three species were killed after 24 to 48 hours in a saturated atmosphere.

Rapidity of germination was proportional to temperature, while percentage of germination was inversely proportional to it. Young conidia germinated more rapidly than older ones. The best medium for germination was water, and germination was more rapid when the conidia were in contact with young leaves than with branches. Dry conditions reduced germination, and no conidia germinated at 50 to 60 per cent. humidity. The number of conidial germ-tubes varied with the species: with *V. pirina* there were 28 to 40 per cent. with one tube, 45 to 70 with two tubes, and 3 to 18 with three; with *V. inaequalis* the corresponding figures were 60 to 90, 10 to 37, and 3 to 5, while with *F. pirinum* var. *pyracanthae* they were 90, 8, and 2, respectively.

The conidia of all three species were highly resistant to cold; when kept at −5° for 150 days or −10° for one month they showed no appreciable reduction in viability, but germinated actively and in higher proportions than conidia not subjected to low temperatures. They were also found to remain viable for at least a year if kept dry. The mycelium in the aerial parts of the host releases conidia from February, or earlier, onwards. In culture (under identical conditions) the colonies of *V. pirina* were violaceous-grey on the surface and olivaceous-black in the medium; those of *V. inaequalis*, deep black below, were covered with an orange-yellow felt, while those of *F. pirinum* var. *pyracanthae* were bluish-green on the surface and olivaceous-black below. Sporulation in culture occurred after six days with *V. pirina*, 10 to 13 with *V. inaequalis*, and 15 to 20 with *F. pirinum* var. *pyracanthae*.

Brown (I. L.). **Curing deficiency of boron in fruit trees.**—*N.Z.J. Agric.*, lxxiii, 5, p. 456, 1946.

In 1934, Sturmer apple trees in an orchard in Central Otago, New Zealand, producing only 25 per cent. saleable fruit owing to boron deficiency [*R.A.M.*, xxvi, p. 64], were sprayed with the usual spring sprays to which borax was added at the rate of 2 lb. per 100 gals., an application being made three weeks after the calyx spray, and another at the same strength three weeks later. Great improvement in the quality of the crop resulted, almost all the apples being marketed.

Jonathan trees similarly treated also improved. The applications were continued annually at the same rate until 1939, when the amount of borax used was reduced to 1 lb. The treatment has since been extended to all pip and stone fruits in the orchard, with excellent results.

HALLER (M. H.) & BATJER (L. P.). **Storage quality of Apples in relation to soil applications of boron.**—*J. agric. Res.*, lxxiii, 6, pp. 243–253, 1 fig., 1 graph, 1946.

As a result of further observations, extended to 1944, of their experiments on the effect of borax soil treatments on the boron content and storage qualities of apples [cf. *R.A.M.*, xxi, p. 529; xxii, p. 437], the authors consider it doubtful that maturity is advanced by these treatments because, although earlier colouring and dropping occur, changes in dessert quality are not advanced. Analyses of fruit showed that the boron content decreases slowly year by year if no further applications are made, but after three or four years it is still considerably higher than that of the controls.

The Jonathan variety was found to be very susceptible to boron injury, internal breakdown of fruit occurring if the boron content rose above 30 to 40 p.p.m. Borax applications to this variety are not recommended unless there is a definite deficiency and even so care must be taken not to apply excess. Rome Beauty also showed slight susceptibility, whereas Grimes Golden, Delicious, and York Imperial not only tolerated up to 2 lb. per tree but showed reduced scald as a result.

MOORE (M. H.). **Bacterial canker and leaf spot of Plum and Cherry. A summary of present knowledge on control measures in Britain.**—*Rep. E. Malling Res. Sta., 1945*, pp. 134–137, 1946.

In this paper compiled from memoranda prepared by the author in association with H. B. S. MONTGOMERY, H. E. CROXALL, and R. W. MARSH the present state of knowledge regarding the control of bacterial canker of plums (*Pseudomonas mors-prunorum*) and cherries (*P. mors-prunorum* and *P. prunicola*) [*R.A.M.*, xviii, p. 689; xxiv, pp. 155, 323, 454] in Britain is briefly reviewed and discussed. The most promising methods of control on plum appear to be the use of a resistant framework [ibid., xxi, p. 25] and foliage spraying during summer with a copper-containing bactericide [cf. ibid., xxvi, p. 18]. With cherry, frameworking is also promising, but very good results have been obtained by spraying with home-made Bordeaux-mixture at 10–15–100 in autumn and 6–9–100 in spring.

HARRIS (R. V.). **Plant pathology.**—*Rep. E. Malling Res. Sta., 1945*, pp. 32–35, 1946.

This report [cf. *R.A.M.*, xxv, p. 125] contains, *inter alia*, the following items of interest. A severe attack of raspberry cane blight (*Leptosphaeria coniothyrium*) [ibid., xxiii, p. 234] associated with heavy infestation by the midge *Thomasiniana theobaldi* occurred on new seedling varieties. Direct inoculations of wounded and unwounded canes to compare the action of the fungus with that of other fungi commonly associated with the lesions indicated that some of the latter are also contributory agents as wound parasites. Promising results in control were given by insecticidal treatment. Further work is in progress. Of five raspberry seedlings tested by grafting, four were tolerant of Lloyd George mosaic (mosaic 1 plus mosaic 2) [cf. ibid., xix, p. 293; xxiv, p. 137]. Of two new virus-free seedlings one was sensitive to mosaic 2 and the other tolerant. Norfolk Giant was useful as an indicator to supplement results obtained with Baumforth's Seedling B in grafting tests.

Parallel experiments in Scotland in conjunction with those at East Malling led to the identification of five distinct types of symptom of raspberry virus disease,

some of which appeared to originate from multiple viruses. All these viruses occur in current Scottish stocks of Lloyd George, three being 'carried' without diagnostic symptoms. This widely grown variety is the main source of trouble in this connexion in the Strathmore raspberry-growing area. It was ascertained that leaf curl [loc. cit.], not yet reported south of the Border, is highly sensitive to climatic factors.

Promising results were obtained in the joint control by spraying of raspberry cane spot [*Elsinoe veneta*: ibid., xviii, p. 325] and raspberry moth (red bud borer).

Grubb (N. H.). **Malling Promise Raspberry.**—*Rep. E. Malling Res. Sta., 1945*, p. 133, 1946.

The new raspberry variety, Malling Promise, has not yet shown any symptoms of mosaic. Observations and small-scale tests indicate that it is highly resistant to natural infection and suggest that most of the cane in circulation is virus-free. Artificially infected, Malling Promise is tolerant towards mosaic 2 [*R.A.M.*, xix, p. 293], though it displays mosaic symptoms when graft-infected with certain combinations of viruses.

Jenkins (Anna E.) & Shear (C. L.). **Gloeosporium venetum and G. necator : two distinct species on Rubus.**—*Phytopathology*, xxxvi, 12, pp. 1043–1048, 1 fig., 1946.

This is an expanded account and discussion of the authors' taxonomic studies on *Gloeosporium venetum* and *G. necator*, a note on which has already been published [*R.A.M.*, xxiii, p. 181]. *G. venetum* is tentatively relegated to synonymy with *Phyllosticta fuscozonata* Thüm. on raspberry in Italy, while *G. necator* is transferred to *Sphaceloma* as *S. necator* (Ell. & Ev.) n.comb. This change does not affect the name of the perfect state, *Elsinoe veneta* (Burkh.) Jenk. (*Plectodiscella veneta* Burkh.) [ibid., xi, p. 724]. The name *G. venetum* as used by American authors refers to *S. necator*.

Reichert (I.) & Palti (J.). **Cycloconium leaf spot of Olives.**—*Hassadeh*, xxvi, pp. 451–452, 1 fig., 1946. [Hebrew.]

The distribution of olive leaf spot (*Cycloconium oleaginum*) [*R.A.M.*, xxiv, p. 24] in Palestine is largely restricted to the coastal plain and the western valley of Esdraelon, though it has also been reported from the western region of Upper Galilee and Samaria, the southern shore of Lake Tiberias, and in Jerusalem. In the coastal plain the first symptoms usually appear in June to July on the previous season's growth, and the development of the fungus seems to continue throughout the autumn and winter. The disease is rife in irrigated groves, on the northern and western slopes, and on the corresponding aspects of individual trees, i.e., where the humidity is higher. The so-called 'Syrian' variety of mixed origin is very prone to infection by *C. oleaginum* and Merchavia is also susceptible, while Ascolano and Mansanillo are less so. Control should be based on the cultivation of resistant varieties in localities favouring the pathogen, supplemented in irrigated groves by spraying with 1 per cent. Bordeaux mixture or 0·3 per cent. perenox, the first treatment being given in late June or early July, the second in September or October, and the third (for very susceptible varieties only) in January.

Meredith (C. H.). **Soil Actinomycetes applied to Banana plants in the field.**—*Phytopathology*, xxxvi, 12, pp. 983–987, 1946.

Significant differences in growth measurements were observed at the Orange River Experiment Station, Jamaica, between banana plants on plots treated with

Actinomycetes of varying degrees of antagonism to *Fusarium oxysporum* var. *cubense* and those grown without such treatment [*R.A.M.*, xxiii, p. 447]. The application of 'antagonistic' and 'slightly antagonistic' Actinomycetes to the soils from which they were isolated resulted in larger growth increases in banana plants than did that of 'very antagonistic' organisms from other soils, but plots treated with the latter produced fewer infected plants than those to which 'antagonistic' and 'slightly antagonistic' Orange River Actinomycetes were added. Mulching failed to stimulate the growth of the plants.

Ciferri (R.) & Baldacci (E.). **Mancata azione antagonista di un sale di zinco sulla fungistaticità dell' 8. idrossichinolina.** [Failure of the antagonistic action of a zinc salt on the fungistatic ability of 8-hydroxyquinoline.]—*Farmaco*, i, 4, pp. 250–253, 1 graph, 1946. [English summary.]

Laboratory experiments showed that, contrary to the results obtained by Zentmyer with other organisms, the addition of zinc sulphate did not inhibit the fungistatic effect of 8-hydroxyquinoline towards *Alternaria tenuis*, *Fusarium oxysporum*, *F. moniliforme* [*Gibberella fujikuroi*], *F. solani*, and *Penicillium notatum*. A re-examination of earlier data [*R.A.M.*, xxv, p. 224] supported these results, and indicated that the probably active interrelation between zinc sulphate and 8-hydroxyquinoline is different from that between the latter and copper sulphate, which is reciprocally potentializing. Graphical analysis of the data suggested that varied reciprocally potentializing effects between the zinc salts and the oxyquinoline were due to the formation of zinc-oxyquinoline compounds which showed differential toxicity to *A. tenuis* spores.

Tunblad (B.). **Kemiska bekämpningsmedel i lantbrukets tjänst.** [Chemical control methods in the service of agriculture.]—*K. LandbrAkad. Handl., Stockh.*, lxxxiv, 4, pp. 245–258, 1945. [German summary.]

In this review of the present position as regards chemical disinfection for plant pest and disease control in Sweden it is stated, *inter alia*, that large-scale cereal seed-grain treatment against fungal pathogens is carried out exclusively by means of mercurial dusts, frequently combined of recent years with an oil solvent [*R.A.M.*, xxv, p. 207].

Trikojus (V. M.). **Chemistry of sodium ethylmercurithiosalicylate.**—*Nature, Lond.*, clviii, 4014, pp. 472–473, 1946.

The preparation and properties of sodium ethylmercurithiosalicylate [merthiolate: *R.A.M.*, xxvi, p. 71] and its methyl and butyl derivatives are described. The fungistatic and fungicidal action of the sodium salt is uncertain. As it decomposes in aqueous solution it is thought that access of water vapour, which also provides conditions for fungal growth, might favour a similar breakdown of the mercurial when incorporated with lacquer, and possibly a further decomposition to more volatile substances.

In a comment on this and the paper by Turner *et al.* [loc. cit.], J. W. J. Fay, of the Ministry of Supply, London, points out that, with the improvement of sealing and packaging, and, if necessary, the use of a desiccating agent, the need to consider a fungicide in designing new optical instruments is eliminated. Samples of the Australian lacquer are being awaited for test in order to determine how far the danger of corrosion, which accompanies the decomposition of merthiolate in the presence of moisture, has been obviated. While evidence of the superiority of the new Australian method over the older treatments is afforded by the results, it is not clear, in the absence of true controls, how far the improvement is attributable to the use of the fungicide.

Norris (D. O.). **Recent advances in plant protectant fungicides.**—*Aust. J. Sci.*, ix, 1, pp. 1–6, 1946.

This survey of recent important developments in the production of plant-protective fungicides is a revision of a paper presented at the second meeting of the Inter-Divisional Committee on Toxicology, C.S.I.R., held at Canberra in July, 1945. Reference to all the studies included in the bibliography has been made from time to time in this *Review*.

Hansen (H. N.) & Snyder (W. C.). **Inheritance of sex in fungi.**—*Proc. nat. Acad. Sci., Wash.*, xxxii, 10, pp. 272–273, 1946.

Continuing their earlier studies [*R.A.M.*, xxii, p. 490], the authors obtained another mutant of *Hypomyces solani* f. *cucurbitae* identical with the normal hermaphrodite in the production of microconidia, macroconidia, and perithecial primordia, and in its ability to become fertilized by conidia from the opposite compatibility group, but differing in that its parts are unable to act as fertilizing elements. This isolate is considered to be a female and when it is mated with an hermaphrodite strain the progeny are in the ratio of one female to one hermaphrodite. It was presumed that the factors for male and female would be alleles and when crossed should produce male and female strains in equal numbers. However, when 200 ascospores from that cross were grown, the mycelia produced were: 84 female, 64 male, 24 hermaphrodite, and 28 neuter, these last producing macro- and microconidia but being unable to function as male or female.

These results indicate that the male and female factors occupy loci some distance apart in homologous chromosomes, and that crossing-over occurs, resulting in the appearance of neuters and hermaphrodites.

Hunt (N. R.). **Destructive plant diseases not yet established in North America.**—*Bot. Rev.*, xii, 10, pp. 593–627, 1946.

Notes (with numerous references to the bibliography of 170 titles) are given on a number of fungal, bacterial, and virus diseases of plants not yet established in North America, though known to be destructive elsewhere. Introductory sections review the criteria for the evaluation of destructiveness of plant diseases, factors affecting such destructiveness (virulence of pathogen, susceptibility of host, reproductive capacity of pathogen, ability of pathogen to spread or reach its host, ability of pathogen to survive, ecological conditions as related to host and pathogen, and difficulty of control), and potential sources of destructive foreign diseases. The paper terminates with a general discussion on the possible channels of entry and recommendations for meeting the danger.

Dexter (R. W.). **The Eelgrass situation in the Annisquam (Massachusetts) and Mystic (Connecticut) tidewater rivers in the summer of 1946.**—*Plant Dis. Reptr*, xxx, 11, pp. 424–425, 1946. [Mimeographed.]

During the summer of 1946 a considerable and significant increase in the abundance and spread of eelgrass (*Zostera marina*) was observed in certain areas of the Annisquam River at Gloucester, Massachusetts, and of the Mystic River at Mystic, Connecticut. The eelgrass disease [? *Labyrinthula macrocystis*: *R.A.M.*, xxiv, p. 377] was still prevalent, but *Z. marina* had more than doubled its growth in one year.

Savile (D. B. O.). **A rapid freehand sectioning method for leaves.**—*Stain Tech.*, xxi, 3, pp. 99–102, 2 figs., 1946.

A description is given of a rapid sectioning method by which a diseased piece of leaf is soaked in lactophenol on a slide and sections are sliced off under the dissect-

ing microscope with a diagonal scalpel having a slightly curved blade. Unsatisfactory sections can be discarded immediately, and it is usually possible to see which sections contain the fruiting bodies of a fungus.

Wagner (R. P.), Webber (H. H.), & Siu (R. G. H.). **The effect of ultraviolet light on Cotton cellulose and its influence on subsequent degradation by microorganisms.**—*Arch. Biochem., N.Y.*, xii, 1, pp. 35–50, 1 diag., 2 graphs, 1947.

The Pressley Index of tensile strength of cotton fibres (*Bull. Amer. Soc. Test. Mater.*, cxviii, p. 13, 1942) served as a useful and convenient measure of the effect of ultra-violet irradiation and the action of *Metarrhizium glutinosum* on cotton fibres [*R.A.M.*, xxv, p. 515] in this co-operative study reported from the Research Division, National Cotton Council of America, University of Texas, and the Biological Laboratories, U.S. Army Quartermaster Corps, Philadelphia. Using this method, the loss of tensile strength from ultra-violet irradiation was shown to be independent of oxygen concentration and humidity, but positively correlated with ultra-violet light intensity and temperature. The reduction in fibre tensile strength amounted to approximately 20 per cent. after four hours' exposure to ultra-violet irradiation of an intensity of 1,060 microwatts per sq. cm. Iron and manganese salts catalyse the deleterious effect of ultra-violet light on cotton cellulose.

The exposure of cotton fibres to ultra-violet rays increases their resistance to subsequent infection by *M. glutinosum*. During the first four days of fungal growth the average rate of deterioration of the unirradiated fibres was twice that of irradiated. There was no difference in the rate of fungal attack on fibres irradiated for the same period and with the same light intensity, but with varying oxygen concentrations and relative humidities.

Romano (F. R.). **The effect of nitrogen on the growth of Chaetomium globosum on Cotton canvas.**—*Amer. Dyest. Reptr*, xxxv, 15, pp. 363–364, 375–376, 2 figs., 1 graph, 1946.

The nitrogen concentration of the nutrient media in general use was found to be insufficient for the maximum growth of *Chaetomium globosum* on untreated cotton canvas [*R.A.M.*, xxv, p. 515], and in experiments at the Industrial Test Laboratory, Philadelphia Naval Base, a definite increase in the development of the mould was secured by the addition of ammonium nitrate at the rate of 1·4 to 1·75 gm. per l., while concentrations up to 7·35 gm. were not inhibitory. The fact that nitrogen was the limiting factor in the growth of the fungus was demonstrated by a supplementary test confirming the adequacy of the other ingredients of the inorganic nutrient solution. A high-nitrogen medium appears to increase the amount of cellulose deteriorated per unit time, and is also more effective than the unfortified substratum in the elimination of doubtfully efficient mildew-preventive treatments, thereby minimizing service failures.

Development of mildew-resisting Cotton in the U.S.A.—*Cotton, Manchr*, 25th August, 1945. [Abs. in *Emp. Cott. Gr. Rev.*, xxiii, 1, p. 69, 1946.]

A new type of cotton yarn, known as 'acetylated' and made by a process comparable to that used in the manufacture of rayon, has been developed in the Southern Regional Research Laboratory, New Orleans. It has the strength and appearance of ordinary cotton, but is highly resistant to mildew and other agencies of decay, remaining almost unaffected by soil burial for six months to a year under conditions causing the disintegration of ordinary cotton in a week. It is intact after two years' weathering. Potato bags made of the new material are not harmed

by the presence inside of spoiled potatoes. Freedom from toxic substances is a further advantage in the usage of the bags for food.

Lester Smith (E.). **British penicillin production.**—*J. Soc. chem. Ind., Lond.*, lxv, 10, pp. 308–313, 1946.

Several pilot and production units for penicillin were erected in Great Britain during the war. The vessels used consisted mostly of milk bottles or special flasks, and the successive operations of washing, filling, autoclaving, inoculating, incubating, and harvesting were usually mechanized. Surface-culture methods could not compete with the submerged-culture processes developed in the United States and now installed in two large British factories, since a single tank may be equivalent to 500,000 milk bottles. The penicillin is concentrated and purified by adsorption or partition processes and the final solution is freeze-dried to enhance its stability. British monthly production figures, lately released, compare as follows with American (in mega units): 1943, 300 and 1,700, respectively; 1944, 3,200 and 138,000; 1945, 26,000 and 570,000; and present (May, 1946), 260,000 and 800,000 (approximately).

A discussion of this paper, read before the London Section of the Society of Chemical Industry on 6th May, 1946, is reported on pp. 313–314.

Pilcher (K. S.). **Biological and biochemical factors in penicillin production.**—Abs. in *J. Bact.*, lii, 6, p. 71, 1946.

None of the biological factors influencing the penicillin yield produced by fermentation is more important than the inherent capacity of the strain of mould used for the secretion of the antibiotic. Some of the mutant strains now in use secured by spore irradiation with ultra-violet light or X-rays give penicillin yields several times exceeding those obtained from the original isolates [*R.A.M.*, xxv, p. 307 *et passim*]. In the fermentation medium commonly employed maize steep liquor and lactose are the chief components [ibid., xxv, p. 407]. The former provides both source of energy and the nitrogenous compounds needed for the building of cellular protoplasm, besides supplying mineral elements, certain growth factors, and possibly a specific precursor of penicillin. The latter furnishes a slowly fermented carbohydrate source which helps to stabilize the pH of the medium throughout the process.

At least five naturally occurring penicillins have been identified, namely, F, G, K, X [ibid., xxv, p. 514], and di-hydro F, and others probably exist.

Thaysen (A. C.) & Morris (Muriel). **Medium suitable for the cultivation of Meredith's Actinomycete.**—*Nature, Lond.*, clix, 4029, p. 100, 1947.

A cheap medium for the growth of Actinomycetes, containing a minimum of materials likely to interfere with the extraction of the antibiotic [cf. *R.A.M.*, xxv, p. 175], is given by the formula: autolysed yeast extract 0·25 per cent., glucose 0·5 per cent., and distilled water to 100 ml., the pH being adjusted to 6 to 7. This was found very suitable for *Actinomyces* [*Streptomyces*] *griseus* [ibid., xxvi, p. 73], giving growth and antibiotic production equal to that obtained with the usual media [ibid., xxv, p. 572]. The growth-liquor of the authors' antibiotic-producing Actinomycete [loc. cit.] was highly active against a culture of *Cercospora nicotianae* from Baarn claimed to be responsible for a tobacco leaf spot.

Magrou (J.). **Les facteurs de la tubérisation.** [The factors of tuberization.]—*Bull. Soc. Acclim. Fr.*, xci, pp. 145–167, 2 pls., 4 figs., 1944. [Received January, 1947.]

This is a discussion of the factors governing the process of tuberization in plants, with special reference to the work of N. Bernard and the author on

mycorrhizal symbiosis in orchids and potatoes, respectively [cf. *R.A.M.*, xxv, p. 520 *et passim*].

Snell (E. E.). **Growth factors for microorganisms.**—*Annu. Rev. Biochem.*, xv, pp. 375–396, 1946.

A bibliography of 153 titles forms the basis of this review of recent advances in the knowledge of the specific nutritional factors required for the growth of fungi and other micro-organisms.

Folsom (D.). **Leafroll net necrosis and stem-end browning of Potato tubers in relation to temperature and certain other factors.**—*Phytopathology*, xxxvi, 12, pp. 1016–1034, 1946.

The form of net necrosis occurring as a sequel to leaf roll in potatoes develops in Maine [*R.A.M.*, xix, p. 492; cf. xxvi, p. 25] mostly during the first two or three weeks after lifting. It is favoured by constant temperatures of 45° to 50° F. and is unimportant at 33° and 70°: at these 'threshold' temperatures, in fact, potentially susceptible tubers may be so 'conditioned' as to remain free from the defect even on later transference to the optimum degree of warmth. Relatively large tuber size is sometimes associated with greater frequency of net necrosis and a higher proportion of diseased tubers occurs among those recently invaded by the leaf-roll virus. Varieties such as Bliss Triumph, Katahdin, or Chippewa, that do not develop net necrosis as a concomitant of leaf roll, become relatively more attractive when the spread of the virus increases in a region like Maine, where soil and storage temperatures are conducive to the disorder. Net necrosis may increase considerably in transit and market should the temperature shift towards the optimum.

In Maine stem-end browning of potato tubers, apparently of virus origin [ibid., xxvi, p. 119], responds to temperature and certain other factors in much the same way as net necrosis, but the critical temperatures for the former are somewhat higher, and smaller rather than larger tuber size increases the percentage of incidence.

Le Clerg (E. L.), Lombard (P. M.), Eddins (A. H.), Cook (H. T.), & Campbell (J. C.). **Relation of spindle tuber and leaf roll to percentage reduction in yield of Irish Potatoes as an aid in plant-disease-survey practice.**—*Plant Dis. Reptr*, xxx, 12, pp. 440–445, 1946. [Mimeographed.]

Estimates of crop losses from disease are of fundamental usefulness for plant-disease surveys. The authors, therefore, have presented the data of the results of their study of four potato varieties affected with spindle tuber and two with leaf roll [*R.A.M.*, xxiii, p. 353] as an expression of the percentage yield losses occurring in each variety in each State at seven different levels of disease. They show that as the amount of either disease increased, so there was a progressive percentage decrease in yield. In most States, however, the seasonal effect on yield reduction was very marked. The data for each year are presented, therefore, so that anyone using them for estimation purposes may compare them (and the relevant monthly climatic data) with the corresponding figures for the season for which losses are being estimated.

Since so many factors are, as a rule, involved in the causation of reduced yield, it is impossible to relate yield directly to disease losses. In using the data provided, consideration must also be given to time of planting, rate of application and kind of fertilizer, cultural methods adopted, climatic conditions, and potato variety. Even with these limitations the data presented permit a more accurate estimate of loss than is possible by means of the 'judgements of opinion' commonly practised.

Montaldo (A.) & Akeley (R. V.). **Herencia de la reacción a la Phytophthora infestans en la Papa.** [Inheritance of the reaction to *Phytophthora infestans* in the Potato.]—*Agric. tec., Chile*, vi, 1, pp. 12–41, 6 figs., 1946. [English summary.]

Following a survey of the principal contributions to the literature on the inheritance of the reaction to late blight (*Phytophthora infestans*) in the potato [nearly all of which have been noticed from time to time in this *Review*], the authors describe the results of their studies on the response to inoculation with zoospore suspensions of the fungus of the F_1 progeny of crosses between selected clones and of the selfed offspring of the parental clones.

The selfed progenies of two susceptible clones, S4710 2 and 336–18, and one resistant, 95–56, gave means of 3·04±0·07, 2·98±0·06, and 2·46±0·07, in a scale of tuber reactions ranging from 1 (absence of fungal growth) to 4 (rapid development of the pathogen). The means of the hybrids between the two susceptible clones and the resistant were 2·08±0·06 and 1·97±0·06, respectively. Significant positive correlation coefficients were obtained between tuber and foliar reaction in a selfed family of the resistant clone 95–56 and in two crosses in which this clone was one of the parents, the values being 0·54, 0·57, and 0·56, respectively. There was significant correlation between rot reaction and firmness in the tuber for two progenies and non-significant for three others studied. In the former two the variation in the stage of maturity reached at harvest time was much smaller than in the three showing no connexion between tuber decay and firmness.

Wilson (J. D.) & Sleesman (J. P.). **Potato-spraying experiments in 1945.**—*Rep. Veg. Gr. Ass. Amer., 1945*, pp. 193–208, 1945. [Abs. in *Chem. Abstr.*, xl, 21, p. 6737, 1946.]

DDT was compared with calcium arsenate in combination with several fungicides in spraying experiments on potatoes in Ohio. Zerlate [*R.A.M.*, xxvi, p. 96] gave a higher yield than Bordeaux, the fixed copper COC–S [copper oxychloride-sulphur], fermate, or dithane when each was used with either insecticide. Zerlate was equal to Bordeaux in early blight [*Alternaria solani*] control, but less effective against late blight [*Phytophthora infestans*].

Le Clerg (E. L.). **Breeding for resistance to early blight in the Irish Potato.**—*Phytopathology*, xxxvi, 12, pp. 1011–1015, 1 fig., 1946.

A large-scale field experiment was carried out in Louisiana in 1945 to test the reactions of 19 named and 445 seedling potato varieties to the early-blight fungus (*Alternaria solani*). Menominee was the only one of the former group to show a marked degree of resistance, and all but about ten of the latter were moderately to severely infected. Menominee is also highly resistant to scab (*Actinomyces scabies*) and moderately so to late blight (*Phytophthora infestans*). Among the early blight-resistant seedlings were four (XL211–1, XL306–2, X528–118, and X627–103) with moderate or high resistance to scab, and two (B273–31 and B273–39) sustaining exceptionally little damage from late blight. The future outlook for breeding for resistance to early blight, combined in some cases with a similar reaction to scab and late blight, appears from these results to be promising.

Riedl (W. A.), Stevenson (F. J.), & Bonde (R.). **The Teton Potato, a new variety resistant to ring rot.**—*Amer. Potato J.*, xxiii, 11, pp. 379–389, 1946.

The Teton potato variety, U.S.D.A. Seedling 47102, derived from a cross between Earlaine and an unnamed seedling No. 45146, though not immune from ring rot (*Corynebacterium sepedonicum*), has shown a high degree of resistance to the disease in Wyoming and Maine from 1940 to 1945 under conditions favouring

heavy infection in the susceptible Triumph, Green Mountain, and Katahdin. Teton also produces satisfactory yields and its culinary qualities are reasonably good.

GANGULY (D.). **Helminthosporium disease of Paddy in Bengal.**—*Sci. & Cult.*, xii, 5, pp. 220–223, 1946.

Experimental evidence is briefly adduced in support of the view that seed-borne infection is of little importance in the development of *Helminthosporium oryzae* [*Ophiobolus miyabeanus*] in the later stages of growth of the Bengal rice crop [*R.A.M.*, xxv, p. 182]. Overwintered mycelium or conidia in the soil may infect healthy seedlings through the roots or collar, but this does not explain the production of localized leaf spots and sporadic attacks on the ears of adult plants. In tests to determine the extent of wind-borne infection, the deposit of conidia on greased slides inside the plots was found only up to a height of 2 ft. 6 in. and the numbers were insignificant, while none reached the slides placed at a distance of 20 ft. from the plots. Although a large number of grasses were susceptible to *O. miyabeanus* in Nisikado and Miyake's inoculation experiments [ibid., ii, p. 231], no host of the fungus other than rice has been found in nature. For the present, therefore, the source of secondary infection remains obscure.

The computation of the losses due to *O. miyabeanus* was greatly complicated during three seasons of observation by the close similarity of its symptoms on the seed to those of its constant concomitant, *Curvularia lunata* [ibid., xxv, p. 182]. Both these organisms and *Trichoconis caudata* [loc. cit.] indiscriminately induced (*a*) emptiness of the grains, with a purplish-brown discoloration and a fair-sized pale to white area marked off either at the centre or one side; (*b*) brownish tinge, turning dull grey; and (*c*) deep brown spots or discoloration, blackening at maturity.

Seed-borne infection by *O. miyabeanus* [ibid., xxvi, p. 45] is most effectively combated by the hot-water treatment, which is useless, however, as a remedy for the evidently more important secondary phase of the disease. Work is in progress at the Department of Agriculture, Bengal, on the development of resistant varieties. Of 44 tested in 1946, Dahar Nagra 273–32, Patnai 549–33, Patnai 23, Kalma 219, and Nagra 41–14 were the most promising.

ANDERSEN (A. L.) & HENRY (B. W.). **The use of wetting and adhesive agents to increase the effectiveness of conidial suspensions for plant inoculations.**—*Phytopathology*, xxxvi, 12, pp. 1056–1057, 1946.

The use of a spreader-sticker combination consisting of 0·05 per cent. sodium oleate and 0·25 per cent. gelatine facilitated the inoculation of rice leaves with conidial suspensions of *Piricularia oryzae* in experiments at Camp Detrick, Frederick, Maryland, in 1944–5, the average numbers of infections per plant in two tests being 11·1 and 6·5, compared with 0·2 and 0·8, for the water controls. Other moderately effective combinations included 0·1 per cent. soft soap plus 0·1 per cent. gelatine (9·5 and 2·1 infections per plant), and 0·05 per cent. sodium oleate plus 0·1 per cent. gelatine (5·8 and 5·3).

SLEETH (B.). **The effect of fungicidal seed treatments on Guayule seedling emergence.**—*Phytopathology*, xxxvi, 12, pp. 999–1010, 1 graph, 1946.

In 1943 the losses due to pre-emergence damping-off fungi (*Pythium ultimum* and *Rhizoctonia* sp.) in guayule (*Parthenium argentatum*) nurseries and direct field sowings at Salinas, California [see next abstract], were so severe as to necessitate extensive re-sowing. In greenhouse tests to determine the relative efficiency of eight fungicides in the protection of the seedlings against damage from these pathogens, the optimum dosage was about 1 per cent. by weight for arasan, spergon, spergonex (ortho-benzoquinone dionium peroxide), cuprocide, and semesan, 0·5 to 0·75 per cent. for No. 604, and 0·25 per cent. or less for mersolite

19 [ibid., xxiv, p. 287]. The treatment of guayule seed with sodium hypochlorite (two hours' immersion of soaked seed in a solution containing 1 to 1·5 per cent. available chlorine) increased seedling emergence in infested greenhouse and sub-irrigated field plot tests, but significantly superior protection was conferred on readily germinating seed by arasan or No. 604. These two preparations and mersolite 19 produced the maximum increases in seedling emergence from both threshed and unthreshed, non-hypochlorite-treated seed in infested soil. On unthreshed hypochlorite-treated seed, however, mersolite 19 did not give such substantial increases as the other two fungicides. In April and May nursery sowings of dry, threshed, non-hypochlorite-treated seed, arasan, spergon, and semesan raised the emergence level over that of untreated, the first-named being particularly beneficial. The emergence of dry, unthreshed seed pre-treated with sodium hypochlorite and dusted with arasan, spergon, or semesan was superior to the non-dusted in a May sowing, but in April the difference was not significant. Arasan and spergon likewise increased the emergence of similarly treated seed soaked in water for four days before sowing in May, but not in April-sown. In a sub-irrigated field, treatment with arasan or No. 604 resulted in significant increases in emergence, both of threshed and unthreshed seed, over the untreated or that soaked in sodium hypochlorite.

On the basis of greenhouse, nursery, and field trials, arasan and No. 604 are considered to be the most promising of the seed-protectants tested for the control of pre-emergence damping-off of guayule, while mersolite 19, tested only in the greenhouse, gave very encouraging results.

Campbell (W. A.) & Presley (J. T.). **Diseases of cultivated Guayule and their control.**—*Circ. U.S. Dep. Agric.* 749, 42 pp., 7 figs., 1946.

Following some introductory observations on the importance of guayule (*Parthenium argentatum*) diseases in California [*R.A.M.*, xxii, p. 496 and preceding and next abstracts], nursery practices in relation to diseases, and general preventive measures against nursery diseases, accounts are given of the symptoms, economic importance, etiology, predisposing and environmental factors, and control of various troubles affecting the crop in (A) the nursery, (B) storage, and (C) plantations. Included in (A) are: damping-off (*Pythium*, *Phytophthora*, *Rhizoctonia*, and *Fusarium* spp.); seedling root rot and pink rot (*Pythium ultimum*) [ibid., xxv, p. 357]; wilt (*Verticillium albo-atrum*); rots caused by *Sclerotinia sclerotiorum*, *S. minor* [see next abstract], and *Botrytis cinerea*; root rots due to 'drowning' in heavily irrigated, impermeable soils or to pathogenic fungi, occasionally a species of *Phytophthora*; and chlorosis associated with nitrogen deficiency: in (B) *S. sclerotiorum*, *S. minor*, and *B. cinerea*: and in (C), in addition to wilt and *Sclerotinia* rots, root and crown rot (*P. drechsleri*); root rot (*Phymatotrichum omnivorum*) [ibid., xxii, p. 496]; an undetermined bacterial rot; crown rot (*Sclerotium bataticola*) [*Macrophomina phaseoli*: ibid., xxiv, p. 117]; rust (*Puccinia parthenii*); and die-backs due to *Diplodia* [*Botryodiplodia*] *theobromae* [ibid., xxvi, p. 29] and drought, followed by infection with *Alternaria* sp.

S. sclerotiorum and *S. minor* were responsible for the heaviest loss of plantable seedlings in the Salinas nurseries in 1942 and 1943, and were also prevalent and destructive to these seedlings in transit between the nurseries and plantations during the same period. In the latter year *B. cinerea* was almost equally troublesome to young plants in storage. The development of these fungi may be prevented by packing surface-dry seedlings so that they neither lose nor acquire additional moisture and by maintenance at a temperature of 32° to 34° F. Avoidance of excessive moisture is an important means of combating *S.* spp. in the nursery and field; under the latter conditions, however, the losses from this source have so far been inconsiderable.

About one-third of the seedlings grown in the Intercontinental Rubber Company's nursery in 1941 were unfit for transplanting in 1942 owing to the combined 'drowning' and fungal root rot.

Phytophthora drechsleri has caused the most severe damage on the clay soils of the Tracy-Newman district. Braun (abs. in *Phytopathology*, xxxiv, p. 933, 1944) observed the disease in 22 out of 25 fields investigated in September, 1943, and losses of 5 per cent. and upwards were recorded for 625 of the 3,745 acres covered. By the regulation of irrigation practices so as to avoid waterlogging the situation was materially improved in 1944. The root lesions are black, slightly sunken, and firm, while the diseased zone of phloem and cortex is dark brown to greenish-black on freshly dug plants, turning uniformly dull black on drying. The lesions on the tap-roots usually develop 2 to 6 in. below soil-level and may attain a length of 4 in. Infected plants wilt suddenly, the leaves shrivelling, turning grey, and generally remaining firmly attached to the plant. The optimum soil temperature for the growth of the pathogen is about 85°, and the maximum crop reductions occur from June to August; below 60° its development is arrested. On irrigated land it is dependent on soil saturation or near-saturation for upwards of 18 hours. Losses from the disease may be reduced to a minimum by the restriction of the main irrigation of heavy soils to the winter months, when both fungus and host are inactive, and in lighter ones by the avoidance of flooding at the ends of rows or in sunken areas of the fields.

Bacterial rot has caused severe damage in irrigated plantings of the San Joaquin valley and similar symptoms have been observed on indicator plots in Texas. The first external feature of the disease is a wilt of the branches, gradual or sudden according to the degree of succulence of the plants; by the time this becomes noticeable most of the tap-root is badly decayed, its surface being covered with black, resinous masses, to which the soil adheres on pulling from the ground. The affected bark is soft, watery, and somewhat spongy, pale to dark brown, occasionally with a vinaceous tinge. The cortex seems to be the first site of stem invasion and progressive deterioration of the associated tissues is the next step. In some plants the resin exudate spreads over the surface in a brownish film, later turning black.

The losses due to *V. albo-atrum* are difficult to appraise, but limited studies have shown that stunting of the plants, imperceptible to casual observation, caused reductions up to 50 per cent. in dry weight of one-year growth. The most reliable diagnostic criterion of the wilt is a brown discoloration of the walls of the wood elements, while many of the vessels become occluded by a yellowish or brownish wound gum. Schneider has shown (abs. ibid., xxxiv, p. 936, 1944) that different strains of guayule vary considerably in their recuperative capacity in respect of infection by *V. albo-atrum*. For example, plants of strain 109 seldom recover, whereas those of 405, 407, and 416 show a high percentage of partial or total restoration; while the most widely planted 593 is of intermediate susceptibility.

Puccinia parthenii was noted in 1945 on both wild and cultivated guayule in Mexico, whence it had already been reported by Lloyd (*Publ. Carneg. Instn*, 139, 1911), but has not yet been observed on this host in the United States, though it was recorded by Arthur on a closely related *Parthenium* species in Texas (*Bull. Torrey bot. Cl.*, xxxvii, pp. 569–580, 1910). Under normal conditions of cultivation the rust appears to be of little importance.

Campbell (W. A.). **Sclerotinia root rot of Guayule.**—*Plant Dis. Reptr*, xxx, 9, pp. 312–319, 1946. [Mimeographed.]

Root rot due to *Sclerotinia minor* and *S. sclerotiorum* caused considerable losses in a 256-acre guayule [*Parthenium argentatum*] planting near Salinas, California [see preceding abstract]. In 1943 the loss, under moderate irrigation, was less than 1 per cent. In 1944, with no irrigation, very few plants died. In 1945, under heavy

summer irrigation, the average loss was 9 per cent., the range for different areas being 5·3 to 14·4. Isolations from affected plants selected at random indicated that 83 and 17 per cent. of the loss were due, respectively, to *S. minor* and *S. sclerotiorum*. Disease incidence was not related to the sclerotial population in the soil, but was closely related to soil moisture, which was the limiting factor during most of the year. Soil temperatures favoured infection from March to November.

Smart (A. B.). **Soil sterilization on a field-scale.**—*Nature, Lond.*, clix, 4029, p. 102, 1947.

When the insecticide 'gammexane' was mixed with fertilizer and sown with oats through a combine seed drill on old lea, the treated area gave stronger, broader-leaved, deeper green plants than untreated, the difference persisting until the oats were a foot tall. When the same compound was sown broadcast on 'brairded' swedes, a similar effect resulted. It may be assumed from these results that the chlorine liberated from the gammexane effected a partial sterilization of the soil and so increased the available nitrogen.

Roach (W. A.). **Mineral deficiencies in agricultural and horticultural crops. II.**—*Rep. E. Malling Res. Sta., 1945*, pp. 83–88, 1946.

The author summarizes the main conclusions drawn from four years' work at East Malling on mineral deficiencies in agricultural and horticultural crops [cf. *R.A.M.*, xxv, pp. 98, 120, 362]. Large increases in yield were obtained from curative treatment both when the deficiencies were indicated by symptoms and when no symptoms were apparent. The importance of complete diagnosis was demonstrated by an experiment in which treatment suggested by symptomatical evidence alone was unsuccessful, whereas when the six elements found by plant injection to be lacking were supplied, the crop was doubled. Suggestions are made as to the lines along which future work might proceed.

Beard (F. H.). **Observations on the incidence of mould (Sphaerotheca humuli) on the new seedling Hops at East Malling in 1945.**—*Rep. E. Malling Res. Sta., 1945*, pp. 107–114, 2 figs., 1946.

During 1945 a serious outbreak of mould [mildew] (*Sphaerotheca humuli*) [*R.A.M.*, xxiii, p. 329; xxv, p. 331] occurred among new seedling hop varieties at East Malling. Of 181 seedlings in short rows of about 15 hills, 13 were attacked in the burr stage and gave no crop, 28 were very severely attacked on the cones, 44 were severely attacked, 30 slightly, 22 showed a trace of infection, and 44 remained unaffected. Incidence was high in certain parentage groups, including the first generations from a wild New Mexican hop [a variety of *Humulus americanus*] and from a wild hop from Manitoba (*H. americanus*). The third generation from the New Mexican hop, the second and third from the Manitoba hop, and the third from a hop of unknown parentage, Oregon Cluster, had a number of unaffected seedlings. Among the larger plantings of named new varieties, none was free from the disease, though Early Promise (X 35) and Malling Midseason (BB 28) showed only a trace, while Brewer's Favourite (OP 21) and Bullion Hop (Q 43) were slightly attacked. Heavy cropping appeared to be associated with high incidence and light cropping with resistance. Notes are given on seven good cropping seedling varieties which remained unaffected.

Martyn (E. B.). **Sugar cane mosaic in Jamaica.**—*Trop. Agriculture, Trin.*, xxiii, 7, pp. 123–129, 1946.

Having reviewed the history of sugar-cane mosaic in Jamaica [*R.A.M.*, xxiv, p. 34; xxv, p. 279,] the author records that a survey of 22 estates showed that none was free from the disease, though complete commercial control has been

achieved in several, the amount of infection being well under 1 per cent. The higher pathogenicity of the virus on poor soils can be counteracted by planting resistant varieties.

While the transmission of the disease by insect vectors is not considered of major importance, though requiring further entomological study in Jamaica, legislation and the insertion in tenancy agreements of a clause forbidding planting of maize or sorghum, food plants of *Aphis maidis*, generally considered to be the vector, have afforded a certain amount of control. Occasionally serious infection may be correlated with conditions temporarily favouring aphid concentrations, and is more likely to occur in some areas than others.

The damage caused by sugar-cane mosaic is highly debatable. Although high percentages of infection have been present for years on estates planted with BH 10/12, no unusual losses in the ratoon crops have been reported. At the same time, shrinking and splitting of the cane occur which must cause loss of sugar. The canes of the tolerant variety, B 34104, which is highly susceptible in Jamaica, do not appear to suffer from infection; danger arises from the fact that the leaf symptoms may disappear almost entirely with maturity and the use of apparently healthy tops perpetuates the disease; in this way, some estates have become 100 per cent. infected, but commercial control on others has been obtained by taking suitable precautions.

The symptoms of mosaic, which vary in intensity with age, season, and environmental conditions, are described. The green type is found on tolerant varieties, such as B 34104, B 37161, and several recent Barbados seedlings; the yellow-mottled or stippled type on BH 10/12 and on resistant varieties is more variable than the green; and the yellow, blotchy type occurs on the resistant B 3439 and one or two Barbados seedlings. Experiments showed that there is only one strain of mosaic virus occurring generally in Jamaica, causing, however, different symptoms on different varieties.

Some leaves of experimentally inoculated B 3439 plants showed mosaic symptoms, but subsequent leaves were normal; one or two shoots of an inoculated stool showed infection and remained stunted, while the rest developed normally. Tops from seriously infected BH 10/12 on a badly drained clay soil estate grew in the nursery without pronounced symptoms; B 3439, interplanted with 100 per cent. infected BH 10/12, was entirely clean; the mature plants of B 34104 showed some splitting and a greyish discoloration of the lower joints on both healthy and infected stools, but transplanted infected tops showed normal growth. Symptoms on the resistant variety B 37161 were often so slight as to escape detection, but became more prominent, on some shoots more than others, in wet weather, then often disappeared with maturation.

In the autumn of 1944 a single stool of the variety B 34104 with pronounced yellow-mosiac symptoms, stunting, and abnormal tillering was reported. Inoculations from this plant to B 34104, B 3439, BH 10/12, and B 37161, and between these varieties when infected, reproduced invariably the distinctive symptoms, islands of dark green on a paler background. These chlorotic areas become very marked in some seasons and cause conspicuous yellowing. Further inoculations of 12 BH 10/12 and 12 B 34104 plants with both normal B 34104 mosaic and with the strain causing the distinctive symptoms resulted in four plants of B 34104 and one of BH 10/12, out of 21 successful infections, disclosing clearly both types of symptom, sometimes on individual shoots of one stool and sometimes on leaves of the same shoot. It was therefore concluded that the distinctive symptoms were those of a new variety of mosaic, and not merely a different strain.

The author's general conclusion is that, although the complete elimination of sugar-cane mosaic in Jamaica is impracticable, the disease no longer presents a serious threat to the industry.

Padmanabhan (S. Y.). **Rhizoctonia-leafspot, a new leaf disease of Sugarcane.**—*Curr. Sci.*, xv, 12, p. 353, 1 fig., 1946.

Rhizoctonia [*Corticium*] *solani* was identified as the agent of a hitherto undescribed leaf spot of sugar-cane observed at Gopalpur, Bengal, on Co. 421, at Pusa, Bihar, on Co. 513 and 313, and elsewhere on Co. 513 since 1941. The initial symptom is a small, dull red spot on the lamina, beside the midrib, spreading in concentric zones in which undulating, dull red lines alternate with broader, whitish areas. The lesions extend much more rapidly lengthwise than across the leaf and commonly measure 4½ to 6 by 2 to 3 in. There is a superficial resemblance between these features and those of the 'banded sclerotial disease' [*R.A.M.*, xviii, p. 616], but the dull red coloration and the concentric development of the zones are distinguishing characteristics of the new leaf spot. The symptoms of both diseases appear at the opening of the monsoon season in the early part of July, but while those of the 'banded sclerotial disease' are no longer recognizable in the crop by the end of August or beginning of September, the other leaf spots persist until November or December. Even more important as an aid to diagnosis is the presence on the leaf blades, partially embedded in the tissues, of the dark, irregular sclerotia of the fungus.

Dennis (R. W. G.) & Wakefield (Elsie M.). **New or interesting British fungi.**—*Trans. Brit. mycol. Soc.*, xxix, 3, pp. 141–166, 26 figs., 1946.

The following are noted among the new or interesting British fungi collected between 1926 and 1945: *Exobasidium camelliae*, transforming a flower of *Camellia japonica* [*R.A.M.*, xx, p. 470] from Sussex into a thick, white gall; *Herpobasidium filicinum* on *Dryopteris filix-mas* and *Polypodium phegopteris*; *Sphaerulina myrtillina* on living stems of *Vaccinium myrtillus* from Perthshire; *Rhytisma symmetricum* on leaves of *Salix* from Great Yarmouth; *Sclerotinia draytoni*, n.sp., parasitic on gladiolus corms; two fungi provisionally referred to *Phyllosticta mali* [ibid., xviii, p. 464] and *Coniothyrium pirinum* producing apple leaf spots in Ross-shire; *Septocylindrium aspidii* widespread on *Aspidium* fronds in Fife; *Helminthosporium tritici-repentis* [ibid., iii, p. 65] on dead leaves of *Agropyron repens*, *H. dictyoides* [ibid., xiv, 515] on *Lolium*, and (?) *H. stenacrum* on *Agrostis*, all at Kew; *H. dematioideum* on flowers of *Anthoxanthum odoratum*, and *H. triseptatum* [loc. cit.] on withering leaves of *Holcus lanatus* both from Surrey; and *Dactylium dendroides* subsp. *leptosporum* from diseased bracken [*Pteridium aquilinum*] from Yorkshire.

Distinctive conidial and sclerotial characters differentiate *Sclerotinia draytoni* from any species so far recorded on *Gladiolus*. The sclerotia are black, smooth, flat, then convex, 8 to 12 by 3 to 7 mm., in irregular masses up to 2·5 cm. long, agglutinated, white within. The microconidia are globose, 2 to 2·5 μ in diameter. The macroconidiophores arising from the sclerotia, are at first dark, hyaline above, 12 to 15 μ in diameter, twice or thrice branched. The conidia are hyaline or pale fuscus, cylindrical-ellipsoid or narrowly ovate, 8 to 16 by 5 to 7·5 μ. Apothecia are on long stalks, at first infundibuliform, eventually convex. The hymenium is 2·5 to 5 mm. in diameter and the asci cylindrical, 8-spored, 140 to 190 by 7·5 to 9 or 10 μ, and the spore-containing part about 80 μ long. The uniseriate ascospores are narrowly ellipsoid or subfusiform, hyaline, often biguttulate, 12 to 17 by 6 to 8 (average 15 by 6 μ); the paraphyses are filiform with a thick, clavate apex.

The two fungi isolated from three apple leaves caused more or less circular, whitish spots of dead tissue, 2 to 6 mm. in diameter, each sharply defined by a narrow, dark brown line and bearing on the upper surface up to 90 minute black pycnidia. While the pycnidia appeared externally uniform, even from a single spot some yielded hyaline, non-septate, somewhat fusiform, usually biguttulate

spores, 2·5 to 6 by 2 to 4 (mostly about 5 by 3) μ, and others very pale brown, elliptical, non-guttulate spores measuring 4 to 5 by 2 to 3 μ. The former were tentatively referred to *Phyllosticta mali* and the latter, at first, to *C. tirolense*, not hitherto reported in Britain. Cultures from spores of the *Coniothyrium* consisted of a thin, brown mycelial mat with dispersed clusters of black pycnidia containing characteristic *Coniothyrium* spores, 3 to 5 by 2 to 2·5 average 4·3 by 2·8 μ. This fungus was non-pathogenic to Doon Star potato tubers, but produced small, circular, superficial, blackish lesions on apples, and caused a rather slow rot of tomatoes. Reference to the literature showed that this pathogen would be more correctly designated *C. pirinum*. When the host ranges of both fungi become known, a revision of the nomenclature may be necessary.

Viennot-Bourgin (G.). **Nouvelle contribution à l'étude de la flore cryptogamique du Valais (Suisse).** [A new contribution to the study of the cryptogamic flora of Valais (Switzerland).]—*Rev. Mycologie*, N.S., ix, 4–6, pp. 37–74, 7 figs., 1944. [Received October, 1946.]

In this further annotated list of fungi collected in Valais, Switzerland [*R.A.M.*, xv, p. 530], the author records *Tilletia controversa* [ibid., xx, p. 495] in the caryopses of *Agropyron glaucum*. The chlamydospores, which measured 15 to 19 by 14·5 to 19 (average, 17·9 by 16·9) μ, resembled those of *T. caries*, being globular to slightly ovoid. The dark brown wall, about 2 μ thick, was covered with wide, polyhedric alveoli.

Petrak (F.). **Beiträge zur Kenntnis der orientalischen Pilzflora.** [Contributions to the knowledge of the oriental mycoflora.]—*Ann. naturh. Mus.* (*Hofmus.*) *Wien* lii, pp. 301–396, 1941 (issued 1942). [Received December, 1946.]

This copiously annotated critical study of several collections of mycological specimens comprises one new subgenus, 31 new species, and one new variety. Among the records may be mentioned *Puccinia allii* on *Allium ampeloprasum* [*R.A.M.*, xix, p. 365] in Chalcidice, Greece; *P. glumarum* on *Aegilops triuncialis*, *P. graminis* on *Berberis densiflora*, *Pseudopeziza trifolii* [ibid., xxv, p. 455] on *Trifolium incanum*, *Polythrincium* [*Cymadothea*] *trifolii* [ibid., xxiv, p. 388; xxv, p. 454] on *T. tomentosum*, *Septoria cynodontis* on *Cynodon dactylon*, *S. graminum* on wheat, and *S. quercicola* on *Quercus longipes*, all in Persia; and *Rhabdospora* (S.) *viciae* [ibid., xix, p. 601] on *Vicia stricta* in eastern Macedonia, Turkey.

Rayss (T.) & Zwirn (E.). **Some interesting Ustilaginales new to Palestine.**—*Palest. J. Bot.*, J. Ser., iii, 2, pp. 114–116, 1944. [Received December, 1946.]

Entyloma dahliae is reported on *Dahlia variabilis* leaves for the first time from Palestine, and to the best of the authors' belief it has not been previously recorded in the Mediterranean region [cf. I.M.I. map No. 114] or the Near East.

Since 1938 *Urocystis tritici* has been found year after year on wheat (*Triticum durum*) in a field at Kiryat-Anavim, and in 1941 it was detected in another locality in the Judean mountains. This is believed to be the first indication of the smut on field plants in Palestine, though it was found by Minz on wheat straw imported as packing from the United States [*R.A.M.*, xxiii, p. 336]. The presence of flag smut has been established in Japan, China, India, Australia, the United States, South Africa, Germany, Holland, South Russia, Bulgaria, Italy, Spain, the Caucasus, Turkestan, Cyprus, and Egypt, while information has been received from Dr. Bremer (*in litt.*) of its occurrence in Turkey. The appearance of this very destructive disease in Palestine gives reason for grave apprehension.

Ustilago scorzonerae [ibid., xiii, p.749] was found in the inflorescences of *Scorzonera papposa*, a new host for the smut.

Hirschhorn (Elisa). **Refundición del género 'Sphacelotheca' en 'Ustilago'.** [Reclassification of the genus *Sphacelotheca* as *Ustilago*.]—*Physis, B. Aires*, xv, 47, pp. 103–111, 1939. [Received September, 1946.]

From a re-examination of over 40 Argentinian Ustilagineae the author makes the following taxonomic changes based on the morphology of the chlamydospores (the main distinguishing feature of the genera under observation); *Ustilago hydropiperis* (Schum.) syn. *Sphacelotheca hydropiperis* (Schum.) de Bary on *Polygonum acre*; *U. cordobensis* syn. *S. cordobensis* (Speg.) Jack. on *Panicum insularis*; and *Cintractia sorghi* (Link) syn. *S. sorghi* (Link) Clint. [*R.A.M.*, xix, p. 240] on sorghum.

Crook (E. M.) & Sheffield (F[rances] M. L.). **Electron-microscopy of viruses: I. State of aggregation of Tobacco mosaic virus.**—*Brit. J. exp. Path.*, xxvii, 5, pp. 328–338, 2 pl., 1946.

Preparations of purified tobacco mosaic virus, separated by Bawden and Pirie's method of differential ultra-centrifugation [*R.A.M.*, xxiv, p. 292], were examined in the electron microscope. Micrograms of the most slowly sedimenting fraction (A) contain particles mostly no longer than their diameter (15 mμ), and indistinguishable on cursory inspection from the spherical tomato bushy stunt and tobacco necrosis viruses. Critical examination showed the sizes in descending order to be tomato bushy stunt, tobacco necrosis, and tobacco mosaic A-type, corresponding to their sedimentation constants of 132, 112, and 30×10^{-13} respectively. With a rising sedimentation rate (fractions B to D) the specimens contain rods of increasing length. Micrograms of crude sap show rods mixed with other plant constituents. Maintenance of the virus for three weeks at 4° C. causes the aggregation of some particles, and this process may be carried further by incubation with phosphate (2 gm. per l.). Heating under certain conditions to 60° or incubation with trypsin at 37° produces many rods exceeding 5 μ in length. No appreciable disaggregation resulted from drying.

Particle length varies also in potato virus X. In no preparation of a rod-shaped virus were all the particles of uniform length, and in the tobacco mosaic virus some of type A were always present. All the evidence points to the dependence of the average rod length on preparative treatment.

Delle Coste (A. C.) & Zabala (S.). **La peste negra del Tomate o 'corcovo' del Tabaco.** [The black pest of Tomato or 'corcovo' of Tobacco.]—*Publ. misc. Minist. Agric., B. Aires*, Ser. A, ii, 17, 23 pp., 4 figs., 1946.

Important contributions to the literature on tomato 'black pest' and tobacco 'corcovo', two distinct manifestations of the same virus [tomato spotted wilt virus: *R.A.M.*, xxv, p. 28], are summarized and discussed in the light of the authors' comparative studies on the disease in Argentina. The following plants proved more or less susceptible in inoculation experiments with the juice of infected plants: *Antirrhinum majus*, groundnut, *Atropa belladonna*, *Callistephus chinensis*, chilli, *Cestrum parqui*, cineraria, *Cyphomandra betacea*, *Datura ferox*, *D. stramonium*, *D. meteloides*, the Jane Cowl dahlia variety, *Hyoscyamus niger*, *Nicotiana glauca*, *N. glutinosa*, *N. longiflora*, *N. rustica*, *N. sylvestris*, *Ocimum basilicum*, *Petunia hybrida*, *Physalis* sp., *Primula* sp., *Salpichroa origanifolia*, gloxinia (*Sinningia* [*speciosa*]), *Solanum capsicastrum*, eggplant, *S. pocote*, potato, *Tropaeolum majus*, vetch, and *Zinnia elegans*. In every case the juice from the artificially infected plants was reinoculated into tomato and *N. glutinosa* with positive results.

Reichert (I.) & Palti (J.). **Powdery mildew of Tomatoes.**—*Hassadeh*, xxvi, p. 547, 1946. [Hebrew.]

The causal organism of tomato powdery mildew (*Oidiopsis taurica*) is a pronounced xerophyte, and its occurrence in Palestine [*R.A.M.*, xxiv, p. 476] in a

severe form on plots planted from May to July is largely restricted to Upper Galilee and the vicinity of Haifa, though outbreaks may also develop in the western Valley of Esdraelon and near Jerusalem. On plots planted from August to October the disease may be destructive in the Jordan Valley and the eastern Valley of Esdraelon. Under favourable conditions of atmospheric humidity (52 to 75 per cent.) and temperature (a daily mean approximating to 25° C.), the first symptoms of infection generally appear five to seven weeks after transplanting to the field. Effective control may be obtained by dusting with sulphur or spraying with sulfinette, cita Californian spray (both at a strength of 1·5 per cent.) or the dispersible sulphur spray spersul (1 per cent.), the first application to be made six weeks after planting and further treatments given weekly during the period of active growth, after which the intervals may be extended to 10 to 12 days; the operations should be discontinued three to four weeks before the picking of the last fruits is due. On furrow-irrigated plots the action of all the above-mentioned preparations is about equal, but where overhead irrigation is practised spraying appears to be preferable to dusting. For the joint control of powdery mildew and diseases requiring copper-containing fungicides, these should be combined with 1 per cent. spersul.

McColloch (L.) & Pollack (Flora G.). **Helminthosporium rot of Tomato fruits.**—*Phytopathology*, xxxvi, 12, pp. 988–998, 3 figs., 2 graphs, 1946.

Since 1934 United States plant quarantine inspectors have intercepted 17 lots of tomato fruits from Mexico, two from Haiti, and one from British Guiana bearing circular to irregular areas, 10 to 30 mm. in diameter, flattened to slightly sunken, with dark to black centres, surrounded at a temperature of 60° to 80° F. by a cream-coloured zone, serving as an important diagnostic character, with an outer ring of bay to burnt sienna to mahogany-red. Occasional lesions advanced slowly at 70° and the cream-coloured zone was absent, the fruits in such cases resembling those attacked by *Alternaria*. At lower temperatures, especially at 50°, the spots were poorly defined and penetration was so slow that by the end of a week the tissue was not completely killed but presented a bronzed appearance. The firm, spongy rot extended deeply into the fruit, and the necrotic tissue was intersected by the dark grey mycelium of the fungus, which also covered the exterior of the lesions and quite obscured their characteristic aspect.

The conidiophores of the causal organism, which is named *Helminthosporium carposaprum* Pollack n.sp., are erect, multiseptate, dark-coloured, 140 to 150 by 6 to 10 μ, sometimes tapering to a width of 4 to 6 μ at the frequently paler apex, while the base is formed by a thick-walled, dark brown, bulbous cell, 12 to 16 by 10 to 12 μ. Under very humid conditions conidiophores are produced as lateral or terminal branches of the hyphae, usually narrower (4 to 6 μ) than those arising from the fruits, and of variable length. Geniculations were not observed. The subhyaline to pale olivaceous, straight or curved, mostly cylindrical, 1- to 5-septate conidia measure 28 to 220 by 6 to 12, usually 120 to 160 by 8 to 10 μ, and are frequently produced acropetally in long chains. When budded they are commonly smaller, paler, and often continuous. Germination is effected by means of one or two polar germ-tubes.

H. carposaprum grew freely on various nutrient agars, as well as on autoclaved green stems of tomato and of a coarse wild grass, sporulation occurring within a week at 70° to 80°. The fungus was shown to tolerate a wide range of temperature, making slight growth at 40° and remaining viable after 51 days at 16°.

Inoculations on tomato stems, foliage, and fully grown green fruits indicated that *H. carposaprum* is a weak parasite. It caused slow to moderate decay on inoculation into harvested eggplant, bell pepper [chilli] (*Capsicum frutescens* var. *grossum*), scallop squash, and York Imperial apple fruits.

The rot does not appear to have increased significantly during the past 11 years, nor have any records been received of its occurrence in the United States.

The 1946 epiphytotic of late blight on Tomato.—*Plant Dis. Reptr, Suppl.* 165, pp. 298–345, 1 fig., 1 map, 1946. [Mimeographed.]

Reports [the results of which are summarized in tabular form] received from different parts of the United States on the epidemic outbreak of tomato late blight [*Phytophthora infestans*] in 1946 showed that it was more or less confined to the east coast States and that the losses sustained ranged from under 1 per cent. in Illinois to 75 per cent. for the early commercial crop in Alabama, for 'green wraps' in Virginia, and the home-garden crop in Massachusetts; in Rhode Island the losses ranged from 70 to 90 per cent. In general, the major damage was done to maturing plants. In many States, however, there was severe infection of young plants, both imported and home-grown. Most growers who attempted control reported spraying to be more effective than dusting, but poor control was due more to lack of equipment and late starting than to the type of application. Figures indicate that in many States few growers, if any, used control measures at all. During 1947 growers are to be warned when infection threatens.

Foster (H. H.). **A report on certain Tomato lines, selections and varieties under observation at the Mississippi Truck Crops Branch Station during 1945 and 1946.**—*Plant Dis. Reptr*, xxx, 11, pp. 410–416, 1946. [Mimeographed.]

Observations in 1945 and 1946 at the Mississippi Truck Crops Branch Station on the reaction to disease of certain tomato lines in greenhouse and field plot experiments showed that certain selections from lines 5 and 8 (seed source: U.S. Vegetable Breeding Laboratory, Charleston, South Carolina), showed marked tolerance of or resistance to early blight (*Alternaria solani*) [*R.A.M.*, xxv, p. 191] and resistance to *Fusarium* wilt [*F. bulbigenum* var. *lycopersici*]. Some F_2 plants from lines 44B284, 44B278, 44B285, 44B277, and 44B389 (seed source: U.S. Beltsville Station, Maryland) were markedly tolerant of or resistant to early and late blight (*Phytophthora infestans*) [ibid., xxv, p. 584]. Certain selections from line 14 (Indiana Station seed) were highly resistant to *F. bulbigenum* var. *lycopersici*, while other lines highly resistant or resistant to this fungus were selections from line 76 (Ohio seed), from lines 45, 46, 47-B, and 61 (Missouri), and from line 29 (Mississippi). Of 14 named varieties tested only Pan America was highly resistant to *Fusarium* wilt but it did not show marked resistance to the foliage blights. Sioux is recommended for districts where wilt is not prevalent.

Jones (Mildred M.). **Blight-resistant Chestnuts.**—*Amer. Fruit Gr.*, lxvi, 41 p. 35, 1946.

Since 1937 a Maryland grower has kept records of the yields from his 19 blight [*Endothia parasitica*]-resistant Chinese chestnut (*Castanea mollissima*) trees [*R.A.M.*, xxiii, p. 320]. There was an increase over the initial yield of 118·75 lb. in every year except two up to 1943, when the harvest amounted to 749·5 lb. A hurricane reduced the output in 1944 to 678 lb. Plantings should be made where strict sanitation can be practised to free the nuts from weevils.

Legislative and administrative measures.—*Int. Bull. Pl. Prot.*, xx, 9–10, p. 85 M, 1946.

India. A Bureau of Plant Protection and Quarantine modelled on that of the United States is to be established in India, with headquarters at New Delhi. Its main purposes will be to prevent the entry of foreign pests and diseases, regulate inter-provincial movements of plant materials, and eradicate pests and diseases already present.